S. hrg. 101-301

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THE STATUS OF THE LONG ISLAND SOUND STUDY AND THE LONG ISLAND SOUND IMPROVEMENT ACT OF 1989

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENVIRONMENTAL PROTECTION

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

THE STATUS OF THE LONG ISLAND SOUND STUDY

AND

S. 1722

A BILL TO ESTABLISH IN THE ENVIRONMENTAL PROTECTION AGENCY
A LONG ISLAND SOUND OFFICE, AND FOR OTHER PURPOSES

OCTOBER 2, 1989—BRIDGEPORT, CT

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THE STATUS OF THE LONG ISLAND SOUND STUDY

MONDAY, OCTOBER 2, 1989

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION,
Bridgeport, CT.

The subcommittee met, pursuant to notice, at 9:45 a.m., in Bonhard Center, University of Bridgeport, Bridgeport, CT, Hon. Joseph I. Lieberman (acting chairman of the subcommittee) presiding.

Also present: Senator Dodd.

Senator LIEBERMAN. Before I begin let me recognize Dr. Eigel.

STATEMENT OF EDWARD EIGEL, PROVOST, UNIVERSITY OF BRIDGEPORT

Mr. EIGEL. Good morning, ladies and gentlemen. I am Ed Eigel, the provost here at the University of Bridgeport. On behalf of all of us here at the university, I would like to welcome you to the hearing this morning and especially welcome Senator Lieberman and Senator Dodd and the panelists who will speak today.

We at the University of Bridgeport are very much interested and concerned about Long Island Sound. To host a hearing on the Long Island Sound Study and the Long Island Sound Improvement Act of 1989 is a distinct privilege and pleasure for all of us. Many of our professors are active in research indirectly and directly concerned with the Sound and coastal areas and this spills over into our classes with special programs and special options within degree programs as well as in courses.

We are very pleased, therefore—because of our location and because of our special interest in the ecological studies as they apply to the Sound and to coastal areas—to welcome all of you to the hearing this morning. We hope that you have a productive and enjoyable day.

Senator LIEBERMAN. Ed, thank you very much for your welcome and for your hospitality. I'm sure I speak for Senator Dodd when I say that we're very proud of the University of Bridgeport. Thank you for your graciousness in greeting us this morning.

Mr. EIGEL. Thank you very much.

Senator LIEBERMAN. We promised a press conference at 9:00 a.m. and a hearing at 9:30 a.m. I think what we're going to do is to combine them at the beginning—which is a little unusual. We will start off with opening statements and then go to questions from the press. Then we will begin the hearing. I will ask that all of this be part of the record and we will delineate anything unrelated to Long Island Sound that's asked at this hearing.

I am delighted to be here and I want to just formally for the record begin by thanking Senator Max Baucus, the Chairman of the Environmental Protection Subcommittee on which I serve, for authorizing this hearing, together with my colleague and friend, Senator Dodd.

I am particularly proud to welcome Senator Chris Dodd and I applaud his long-term commitment to the health of Long Island Sound. First, as a congressman from a district bordering the Sound, then as a Senator, and may I say as a boatsman, Senator Dodd has been an outstanding advocate for the betterment of Long Island Sound.

We have for the record from statements Senators Moynihan and D'Amato and Congressmen Shays and Morrison. We will enter them into the record at the appropriate point. (See pp. 6–9.)

STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S. SENATOR FROM THE STATE OF CONNECTICUT

Senator **LIEBERMAN**. I have a longer opening statement which I will enter into the record following a few brief remarks.

Ever since the glaciers of the Ice Age receded thousands of years ago Long Island Sound has been a unique and very valuable feature of our environment. Today, we are more dependent on Long Island Sound than ever before for recreation, for transportation, and for commerce. Long Island Sound actually defines Connecticut's southern shore, but it is obviously more than one State's resource. Ten percent of the population of the United States lives within fifty miles of Long Island Sound. It is beautiful but it is also polluted. It is also in danger of becoming a Dead Sea. That's why Senator Chris Dodd and I are here today.

This week we are introducing into the United States Senate the Long Island Sound Improvement Act of 1989. This legislation, which creates a Long Island Sound office in the Environmental Protection Agency, is designed to get the Federal Government permanently involved in the future of Long Island Sound by coordinating and directing its resources to cleaning it up. In basic terms, we just believe that Long Island Sound is important enough that there should be people in the Federal Government whose sole responsibility is the Sound and its future.

The truth is that we need coordination. There are two States that are vitally interested in Long Island Sound. There are two regional offices of EPA. One estimate recently indicated that there are as many as 150 separate governmental jurisdictions—village, town, city, State, and Federal Government—that are involved in the management of Long Island Sound. If we're really going to do what we want to do—and that is to clean up the Sound—there needs to be coordination of all that activity and management, and that's what this office will be all about. It will become the focal point of our efforts to preserve this tremendous natural resource, Long Island Sound, for ourselves and for our children. This office will ensure that the interest of the Federal Government in the Sound is not sporadic—does not go from one occasion to the other—but is permanent and increases over time.

The Long Island Sound Program Office is patterned after a similar one for Chesapeake Bay, will be located on or near the Sound and it will coordinate studies of the Sound and oversee distribution of funds to protect it. The director of this office will be responsible for bringing together the resources of the many State, local, and Federal agencies that play a role in protecting the Sound.

Second, our legislation will also keep the on-going Long Island Sound Study alive past its current 1991 completion date. The study has accomplished a great deal already. Our knowledge of the Sound is obviously incomplete and we need more time to ascertain where the threats to the Sound are coming from and how we can act against those threats.

Third, the bill will also create a Long Island Sound Fund. Money collected by Federal suits against polluters of the Sound and its tributaries will go into this Fund and that will be used to help clean up the Sound. To me, that's justice in its purest form. I believe it will serve as a model for similar programs across the spectrum of environmental enforcement.

The Long Island Sound Program will streamline coordination of State and Federal resources in the battle to protect this important body of water. It will basically give us a guarantee that Uncle Sam will perpetually be interested in and direct the clean up of Long Island Sound. We have abused this treasure for too many decades. I think we've come to understand that in recent years and it is time for us now to turn this particular tide.

I am honored that I am joined in cosponsoring this legislation both by my colleagues from New York—Senators Moynihan and D'Amato—but also by my friend and colleague, Senator Chris Dodd of Connecticut, who I am proud to introduce to you at this time.

[Senator Lieberman's written statement follows:]

OPENING STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S. SENATOR FROM THE STATE OF CONNECTICUT

I'd like to begin by thanking Senator Baucus, Chairman of the Environmental Protection Subcommittee of the Environmental and Public Works Committee of the United States Senate for allowing me to chair this hearing in his place as our committee considers the status and the future of Long Island Sound.

I'd also like to welcome Senator Dodd and applaud his long-term commitment to the health of Long Island Sound. First, as a Congressman from a district bordering the Sound, and then as a Senator. Chris Dodd has been an advocate for a better environment and a cleaner Sound.

Long Island Sound was one of the first four estuaries in the country to receive federal recognition. Since 1985, Long Island Sound has been the subject of a massive effort by state, local, and federal agencies to determine the nature of its problems and a plan by which to manage them.

This effort is known as the Long Island Sound Study, and as we count down on the last year and a half of this Study, it's useful to look at where we are, where we must go, and what further steps are needed to get us there.

While the cooperative efforts of the Management Conference of the Study (involving two states and two regions of the EPA) have been praised around the country, there is some concern about what will happen once the Study is completed. How complete is complete? Has the Study had sufficient resources to plan for the control and abatement of all the problems it's identified? Should the federal government abdicate all responsibility for continued cooperative efforts when for 5 years it's been an integral part of those efforts? Has the study gone far enough to generate a cooperative approach to cleaning up Long Island Sound? What, for example is the level of involvement of the towns and cities along the Sound?

According to a recent article in the New York Times, there are (and I quote) "nearly 150 village, town, city, county, state, and federal jurisdictions involved in the management of Long Island Sound."

Clearly there is a need for a formal mechanism of coordination and cooperation as the States of Connecticut and New York begin to implement the Comprehensive Conservation and Management plan mandated by the Long Island Sound Study.

Tomorrow, I will introduce the Long Island Sound Improvement Act of 1989. I am proud to claim Senators Dodd, Moynihan, and D'Amato as cosponsors.

The Long Island Sound Improvement Act of 1989 directs the Administrator of the EPA to continue the Management Conference of the Long Island Sound Study so that it will continue its work on toxics and address the Unfinished Agenda of the study.

This bill concurrently creates an office of the Long Island Sound Program within the EPA to be located alternately every five years in Connecticut and New York to oversee, coordinate, and support the implementation of the Comprehensive Conservation and Management Plan.

The director of this office will act in cooperation with the Management Conference. The director will be responsible for making enforcement reports and recommendations to the states and to EPA; will establish liaison with the head of all federal agencies or departments which have jurisdiction over Sound Issues; will make grants to the states to implement the Sound Study management plans; and will be responsible for a series of critical new studies. The results of these studies will be blended into the Comprehensive Conservation and Management Plan, thus making it a dynamic, ongoing plan, responsive to immediate needs as well as mindful of long-term strategies.

If there's one thing I've learned through my work this year on the Environment and Public Works Committee, it's to remember John Muir. He said, "When we try to pick out anything by itself, we find it hitched to everything else in the universe.

Consider the following: As the people in this room know, in Long Island Sound we suffer a condition known as Hypoxia, low or dissolved oxygen. It works like this: excess nitrogen and phosphorous (from overworked sewage treatement plants and agricultural runoff) act on algae the way fertilizer acts on a lawn. In the summer, when this condition is acute, the algae blooms, hugely, and covers miles. The water turns russet colored. These blooms eat up a lot of oxygen as they're forming. When they get too heavy, they sink. And on the way down, as they decompose, they eat up even more oxygen. By the time the blooms hit bottom, anything that cannot swim away fast enough is asphyxiated.

In the human blood stream, a similar condition exists. When the lung takes in excess CO (from automobile exhaust and industrial sources), it sets off a chain reaction among the blood cells; they mutate in order to fight off the poison, banding together to form a larger entity which in turn generates an increased appetite for oxygen. The healthy cells suffocate and die. This condition is also called Hypoxia.

In John Muir's words, "everything is hitched." That is why the Long Island Sound Study is so important. It recognizes this through its cooperative efforts and through its comprehensive approach toward restoring the health of Long Island Sound. It does not accept suffocation as a reasonable status-quo.

Through the Long Island Sound Study's efforts to recreate the water quality and water circulation of the Sound through computer models, it links the harm of excess fertilizers along the Connecticut River and the excess nitrogen from sewage treatment plants on the East River. It calls our attention to the value of tidal wetlands as nature's filter for our pollution and nature's nest for wildlife. It focuses concern on atmospheric loadings and to the constant oil spill that our major highways cause. And it hits us with the revelation that the largest single cause of floatable debris on our beaches is our own good old-fashioned litter.

We are constantly learning more about this resource—how the stresses we place on it are interrelated, and how the solutions are interrelated as well.

That is why I, and Senators Dodd, Moynihan, and D'Amato feel it imperative that the good work of the Study continue, and that the implementation of its management plan be coordinated and cooperative at every level.

This morning we are fortunate to have a number of distinguished witnesses to testify to the status of the Long Island Sound Study and to its future. Our initial panel is made up of members and representatives of the Long Island Sound Study's Policy Committee. I welcome Mr. David Fierra, Water Division Director for U.S. EPA Region I. Mr. Fierra will set the scene by describing the significance of the Hypoxia problem In Long Island Sound and the plans for controlling it, in addition to the work done on toxics. Commissioner Leslie Carothers of Connecticut's Department of Environmental Protection will take us through the state's preparations for implementation, and outline some of the projects already undertaken. And Dr. Roberta Weisbrod, special Assistant to Commissioner Jorling from NY's Department of Environmental Conservation will give us the perspective of New York State.

Our next panel shifts focus from government to citizen. We hear first from Connecticut's own Soundkeeper, Terry Backer, on the perspective of fishermen and the role citizens can play in monitoring compliance and enforcement efforts. Mr. Chester Arnold, the Public Education Coordinator for Connecticut Sea Grant and Chairman of the Citizen's Advisory Committee of the Long Island Sound Study takes us through what the Study has accomplished thus far in citizen outreach and education and where we go from here. Mr. Jim Leahy, Executive Director of CONNPIRG will present the preliminary findings of CONNPIRG's compliance report for the state of Connecticut and testify to the need for creating a political will to accomplish some of the hard choices we have in front of us. And Mr. David Miller, Regional Vice President of the National Audubon Society joins us from New York to outline some of their initiatives and advise us on the role environmental groups might play in organizing communities into action.

Our final panel addresses the local concerns inherent in implementing a plan of this size and begins to take a look at some of the long-term financing needs this plan may require. We welcome Mayor Thom Serrani of Stamford. Senator John Atkin of Norwalk updates us on the efforts of the legislatures of Connecticut and New York to work together on the laws affecting the Sound. And Mr. Ken Rubin, President of Apogee Research, outlines some of the research begun on financing strategies in addition to his experiences doing similar work for Narragansett Bay and Puget Sound.

OPENING STATEMENT OF HON. CHRISTOPHER J. DODD, U.S. SENATOR FROM THE STATE OF CONNECTICUT

Senator Dodd. Thank you, Joe, very, very much. I will be brief. You have really covered the issue pretty well in terms of what is included in the bill. We're going to be hearing this morning from people in the two-State area, from Mayors, State Representatives, and people from the Department of Environmental Protection who will offer us, I'm confident, some good commentary on this.

I also want to thank the folks from the University of Bridgeport for providing us with this venue this morning to talk about our bill and to talk about where we are with the Long Island Sound Study, which has been a very important element—and will be in the coming years—in terms of trying to improve the quality of the water in Long Island Sound.

As you mentioned, Long Island Sound is truly one of the national treasures that we all have used—some more than others—at one point or another over the years. It is really a phenomenal body of water. As you point out, there are roughly 10 percent of the American population living within a few miles of Long Island Sound, in excess of some 20 million people. Interestingly, which I did not know, 75 percent of the United States population lives within 50 miles of the coastline of this country. By 1990, I should say, that number will be the case.

Long Island, which is 110 miles long and 1,300 square miles in total size, has a coastline which is 577 miles running through two States. The water from 16,000 square miles of land in New York, New England, and parts of the Quebec drains into the Sound. According to the National Oceanic and Atmospheric Administration, 86 sewage treatment plants release more than a billion gallons of wastewater into the Sound each and every day. Indirect and direct industrial discharges, combined sewer overflows, urban stormwater runoff, and agricultural and construction runoff also contribute to the pollution loads into the Sound.

During the summer of 1987, we all recall conditions in Long Island Sound were possibly the worst in its history. Federal officials tested the water in one area—the western part of the Sound not far from here—that contained no oxygen whatsoever in the water. Lobstermen hauled in traps full of dead lobsters that had suffocated in this water. Chemical tests on the tissue of fish and shellfish caught in the Sound found such toxic materials as mercury, lead, copper, and PCBs. I am confident that the Long Island Sound Study will provide us information that is going to be extremely important in ways in which to clean up the Sound.

I should point out, that we were successful last year in adopting my amendment banning the dumping of medical waste in the oceans and inland waterways, including Long Island Sound, which was included in the Ocean Dumping Act and is now law.

We know that 44 sewage treatment plants around the Sound need to be upgraded but we're looking at a cost of up to $1 billion in Connecticut and $5 billion in New York. I don't know how the States and local governments can carry that burden without some assistance from the Federal government.

We've got a lot of work to do but we're on the right track. What is always necessary, of course, is public interest. That is there. I think our constituents are deeply interested in the work being done in this. The Long Island Sound Study begun in 1985 is on the right track, so we're in place for that. I think this legislation will compliment that effort extremely well. We can just hope that we will find the resources and can convince our colleagues of the importance of this effort in the coming years as we face tighter budget constraints that we all know are plaguing us in trying to make decisions about important needs in this country.

I think this hearing is extremely worthwhile. I congratulate you for doing it. I must say that while Joe has been in the Senate just for eight or nine months, he has already established a tremendously fine record in the Senate of being deeply interested and concerned in environmental questions. I think it is extremely important for all of us in this country, but particularly in Connecticut, to have someone who is serving on a committee that is directly involved, sitting on the subcommittee directly involved with these issues. I would like to say that as a citizen of this State, I feel far more confident that we're going to have the Sound protected because you are there and how important that will be to all of us. So I am pleased and honored that you asked me to join you today in the hearing.

We better get to our witnesses.

Senator **Lieberman**. Thank you. Do we want to allow the press to have any questions now?

Senator **Dodd**. I'd prefer they didn't, but we can.

[The statements previously referred to follows:]

STATEMENT OF HON. DANIEL PATRICK MOYNIHAN, U.S. SENATOR FROM THE STATE OF NEW YORK

Mr. Chairman, your commitment to the Long Island Sound is well known and greatly appreciated by myself and the residents of our States. Our region and our

States should be proud. It is with great enthusiasm that I join with you, Senator Dodd and Senator D'Amato in sponsoring the Long Island Sound Improvement Act of 1989.

As you know, our two States have worked together on improvements to the quality of the Long Island Sound. This included legislation to create the Long Island Sound Study. The Long Island Sound Improvement Act is a good next step and I am pleased to be part of the effort. The Long Island Sound Study has made significant strides in identifying and understanding the sources of pollution in the Sound. The work of the study will continue, as it should, and will guide the efforts of the interstate management conference established by our bill.

Mr. Chairman, Connecticut and New York share many things. We are bound together by, among other things, the Long Island Sound. It is our border, and our common patrimony. With over one hundred towns and villages on its shores, the Long Island Sound serves both for leisure and as a place of work. It is the purpose of the Long Island Sound Study to find ways to improve the health of this body of water. It will now be the purpose of our legislation to put these ideas to work. This must be done!

The States of New York and Connecticut have done much by themselves to help the Sound. As has the EPA. But the federal commitment must not end when the study is done. The EPA must help implement the findings of the study. Experience has shown that the type of program we are advocating works. It has helped in the Chesapeake Bay and the Great Lakes. These programs have had their problems, and our legislation tries to solve some of them.

Mr. Chairman, your perseverance is well known, and will serve you well on this legislation. I look forward to our cooperation. Thank you.

STATEMENT OF HON. ALFONSE M. D'AMATO, U.S. SENATOR FROM THE STATE OF NEW YORK

Mr. Chairman, I would like to commend you for holding this hearing this morning on one of the area's most important natural resources, the Long Island Sound. I am pleased to join with you and Senators Dodd and Moynihan in cosponsoring the Long Island Sound Improvement Act of 1989.

The quality of life on Long Island is so dependent upon its coastal waters . . . especially the Long Island Sound. Approximately 5 million people live within 15 miles of the sound's shoreline. Year round, the sound attracts thousands of citizens for fishing, boating and swimming. In 1988, the sound was recognized as one of this country's most important natural resources by its inclusion in EPA's National Estuary Program.

In 1985 I was one of the key players in initiating the Long Island Sound study. The goal of the study is to identify and understand the sources of pollution in the sound and ultimately produce a comprehensive conservation and management plan which both New York and Connecticut have agreed to implement. While the study has been successful in determining that hypoxia is a major problem in the sound, limited resources have prevented in-depth investigation into the toxics problem.

The Long Island Sound Improvement Act will create an office within the Environmental Protection Agency called the Long Island Sound Program Office which will oversee the sound's management plan. The new office will be located on or near the sound, alternating between New York and Connecticut every 5 years. Its director will be appointed by the EPA Administrator.

One of the most important duties of the director will be to undertake a series of studies on 1) a 20-year growth assessment of the adequacy of wastewater treatment facilities along the sound to handle increases in population; 2) non-point source pollution; 3) shell fish health; 4) recreational uses; and 5) the establishment of an oil spill contingency plan.

I am delighted to be a cosponsor of this comprehensive piece of legislation which will greatly enhance the quality of the Long Island Sound. I look forward to working with my colleagues in moving this bill through Congress.

Thank you, Mr. Chairman.

STATEMENT OF HON. BRUCE A. MORRISON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CONNECTICUT

Mr. Chairman, I first want to thank you and the other members of the Subcommittee for allowing me the opportunity to testify here today about our efforts to save Long Island Sound. I also want to salute you and your efforts on this issue since your arrival in the Senate earlier this year.

Long Island Sound is indisputably one of the region's most valuable resources. The many recreational and economic opportunities it provides are unequaled. Annual catches of shellfish and finfish have been valued at $20 million in recent years, 20 million people used the beaches last year, and there were 200,000 boats registered Soundwide. However, numbers cannot adequately represent the value of the Sound. Its natural beauty and the animal life it sustains are priceless.

The Sound is under tremendous pressure. Years of economic growth have strained its delicate ecological balance. The 15 million people who live within the drainage basin of the Sound and the 60 communities along the Sound's 577 mile coast burden the ecosystem with effluent from 44 sewage treatment plants. The heavily industrialized and populated communities bordering the Western Sound dispose of waste directly into the water. Fertilizers from Connecticut farmlands, golf courses, lawns and gardens eventually find their way into the Sound. Everyone shares in the responsibility.

As you know, community awareness about the crisis the Sound faces is rising as a result of extensive media coverage last summer. Sewage spills and medical debris washing up on beaches are highly visible symptoms of the crisis and attract lots of attention. However, there are other problems such as chemical contamination and hypoxia, which are less visible, yet equally as serious. These problems are not new.

However, we face a complex problem of government and politics. Long Island Sound's problems cannot be effectively handled by Connecticut alone, nor by new York State, nor by the communities along it shores or upstream along rivers that flow into the Sound. The Sound belongs to all of us. Its problems affect all of us. And the solutions are up to all of us—together.

As you know, I am the co-chairman of the Congressional Long Island Sound Caucus, a coalition of the ten members of the United States House of Representatives whose districts border the Sound. Our primary goal is to ensure continued Federal funding for the Long Island Sound Study, the five-year project to analyze the problems that face the Sound. When completed in 1991, the Study will help us to understand the sources and locations of the sound pollution and will provide recommendations for securing the future health and productivity on the Sound.

The House has passed all of its appropriations bills for the Fiscal Year that begins today. I am happy to report that these House bills contain all of the funding for the Study that we requested. This amount includes $1 million from the National Oceanic and Atmospheric Administration (NOAA) and $1.4 million from the Environmental Protection Agency (EPA).

When the Long Island Sound Study ends in two years, we will be left with a plan of action. We need to ensure that it is followed. Mr. Chairman, I am happy to join you in introducing "The Long Island Sound Improvement Act of 1989." This bill will make permanent the Management Conference of the Long Island Sound Study and establish a Long Island Sound Program Office in EPA. These are both sensible steps in ensuring the long-term health of the Sound. Several other members of the Caucus, including our Connecticut colleagues Chris Shays and Sam Gejdenson, have indicated their interest in co-sponsoring this bill.

One thing we have already learned is that protecting wetlands and other critical habitats is a crucial part of protecting the Sound. In April, I organized a letter signed by 17 of my colleagues and testified in support of an allocation of $150,000 for a study of coastal areas on Long Island Sound and in Rhode Island and southern Massachusetts by the Fish & Wildlife Service with an eye toward future additions to the Stewart B. McKinney National Wildlife Refuge and other national wildlife refuges. This money was included in both the House and Senate Interior Appropriations bills, and I look forward to the completion of this study, too.

Finally, we must be ready to address problems when they arise. A year ago, Congress passed legislation I introduced that made Connecticut part of a federal demonstration program, along with New York and New Jersey, requiring the tracking and documentation of all medical waste. With this legislation in place, reports of medical waste washing ashore on Sound beaches slowed to a fraction of their 1988 levels.

Mr. Chairman, I can assure you that the Long Island Sound Caucus will continue to push to make sure that the Study is completed and that its recommendations are carried out. We are happy to have your leadership on Sound issues in the Senate, and thank you again for allowing me the opportunity to be heard today.

STATEMENT OF CHRISTOPHER SHAYS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CONNECTICUT

First, I would like to commend Senator Joseph Lieberman and the Senate Committee on Environment and Public Works for holding this important hearing on the status of the Long Island Sound Study, plans for its future implementation and new legislation to further address pollution problems plaguing the Sound.

Long Island Sound is precious to us. It's one of only 192 estuaries (where salt and fresh water mix) in the entire country. Seventy-five percent of our fish food comes from these estuaries. And like the Puget Sound or the San Francisco Bay, Long Island Sound is in jeopardy.

We're told we are at the edge . . . while Long Island Sound is a resilient body of water, it is having a difficult time replenishing itself. Unless we act now to save the Sound, it may become another Chesapeake Bay.

I am pleased to offer my enthusiastic support for the Long Island Sound Improvement Act of 1989.

This bill will help ensure that the federal government continues to be involved in the Long Island Sound Study through its implementation phase. While we are currently collecting valuable data about the pollution problems in the sound, this information is useless unless we have the necessary funds and an effective management team to carry out the recommendations of our dedicated scientists.

In addition, this legislation will provide for a Toxics Managment Plan. The Long Island Sound Study has focused primarily on the serious hypoxia or low dissolved oxygen problem in the Sound. We need to be spending more resources to adequately address the problem of toxics.

Our nation has made great progress toward reducing toxic waste—we're seeing the return of species of fish and shellfish that haven't been seen in years—but we have a long way to go. The Clean Water Act of 1972 has made a difference, but it needs to be better enforced.

This new legislation will also help ensure the continued cooperation between Connecticut and New York State by setting up a Long Island Sound Program Office that will alternate between Connecticut and New York every five years. State cooperation and coordination is critical for any successful long-term solution.

Long Island Sound and other estuaries like it may die unless we act immediately to address the hypoxia problem and other contributing factors. To save our precious estuary, we must not only upgrade our sewage treatment plants, but also provide protection for coastal wetlands, stop raw sewage discharges from combined storm and sanitary sewage systems, prevent the dumping of medical wastes, control the problem of acid rain and the run-off of sediments, fertilizers, pesticides and toxic materials from farms, construction sites, surburban areas and city streets.

It is a costly and difficult challenge, but one we can and must meet—not only for ourselves but also for generations that follow. Our children and our children's children should have the same opportunity we do to enjoy the Sound as a source of food, recreation, livelihood and natural beauty.

I would like to give special thanks to Terry Backer, Chester Arnold, Jim Leahy and David Miller and other concerned citizens and environmentalists who have dedicated their time and knowledge in championing this important cause. I would also like to commend the fine efforts of Senator Lieberman and his staff in crafting this meaningful legislation.

I look forward to working with Senators Lieberman and Dodd and the House members of the Connecticut delegation to enact the Long Island Sound Improvement Act of 1989. We all know the problems in Long Island Sound transcend politics and a solution will be found only if we work together in a bipartisan effort on the federal, state and local levels.

Senator LIEBERMAN. Let's move to our first panel consisting of Dr. Weisbrod, Commissioner Carothers, and Mr. Fierra. While they are coming forward I will tell you a little bit about who they are.

David Fierra is the Water Division Director for the U.S. EPA Region I. We're hoping today that he will set the scene by describing the significance of the Hypoxia problem in Long Island Sound and the plans for controlling it, in addition to the work done on toxics.

Commissioner Carothers, who I always like to introduce as one of my favorite clients in my previous incarnation, will take us through the State preparations for implementation, and outline some of the projects already undertaken.

Dr. Roberta Weisbrod, who we're glad to welcome, is a special assistant to Commissioner Jorling from New York's Department of Environmental Conservation. Commissioner Jorling has been a real regional and national leader in the battle for a better environment. He's been a real help to us in Clean Air Act doings in Washington these days. Dr. Weisbrod will give us the perspective of New York State.

I have with me here Barbara Cairns, who is my legislative assistant with special emphasis on environmental protection. I appreciate all the work that she did in putting this hearing together.

Let's begin with Mr. Fierra. Thank you for being here and I would ask you—since we've taken up so much time already—if you have statements, we will include them all in the record, and if you could generally try to keep your opening remarks to about five minutes, then we can enter into some dialogue.

STATEMENT OF DAVID FIERRA, DIRECTOR, WATER DIRECTOR, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION I

Mr. FIERRA. Thank you, I'll do so. I'm happy to be here. As the Senator mentioned, I am the Director of the Water Division for EPA office in Boston.

As was mentioned earlier, the Long Island Sound Study started with a congressional appropriation in 1985, which named four estuaries of national significance to be studied for development of restoration plans.

In 1987 the Clean Water Act Amendments formalized the National Estuary Program and provided for the formal designation of estuaries of national significance. Long Island Sound was one of the first four that were designated under the Clean Water Act. Provisions of that Act provided for five years of funding and, most importantly, the development a comprehensive management plan to be developed jointly by EPA and the States and other agencies involved.

These programs have been modeled after the Chesapeake Bay Program. The important parts of these programs are that they take a geographic approach looking at the body of water as a whole. They focus on the vital signs of these estuaries such as: the quality of the marine life, the quality of the water, and the sediments.

As part of each of these studies, EPA and the States have formed committees that have looked at the broader issues in identified areas that needed greater information. We've done this by looking at all previous studies and data available and then developed plans for developing research to deal with the remaining data gaps. Through the study we have identified what we consider the five most important problems to be studied. By "we", I mean the policy committee, the management committee, and the various committees that make up Long Island Sound, including public interest. Those issues that we've identified are Hypoxia, or low dissolved oxygen; toxics; pathogens; floatable debris; and management of the fisheries.

I would like to talk this morning a little bit about the two most significant issues—Hypoxia and toxics.

Hypoxia can occur through natural events. However, data in Long Island Sound shows that much of it has been intensified through man-made activities. Hypoxia causes a problem when nutrients are in abundance, significantly increasing phytoplankton which die off and then ultimately drain the oxygen from the waters. In the summer of 1987, there was a significant event here in Long Island Sound. Levels of dissolved oxygen dropped significantly and in some parts of the Sound to as low as zero. There were fish trawls that were made during that time, very few fish were found, there were some invertebrates found, and even 30 percent of those were dead. Dissolved oxygen in other years during the study have been significantly low, not as low as in 1987, but much below the State standards.

We have been developing models to deal with the Hypoxia issue, both water quality models and hydrodynamic models. Much of the effort we've put into the Sound has been studying and collecting data needed to go into the models. We hope to have a final model completed in November of 1991. In the meantime, we will be looking at what levels of oxygen are needed in the Sound in order to maintain a healthy and viable fishery.

Also, we have work groups that are going to be looking at nonpoint source contributions, point source contributions, and other contributions. To ultimately reduce nutrients, we know we're going to have to deal with sewage treatment plants. We also know we're going to have to deal with non-point source problems. It is going to be a very expensive proposition. Whatever the strategies we come up with, it is going to involve a significant commitment from all of the communities. In order to help alleviate some of those financial burdens, we're also funding a financial study through the Long Island Sound Project to try to come up with innovative ways of funding some of these clean-ups.

By next October, we hope to have preliminary results done on the modeling. It won't involve all the hydrodynamic modeling but it will be good enough for us to start making some early judgments in terms of what kinds of combinations of controls are necessary.

The second issue that I want to touch on just very quickly is the toxics contamination in the Sound. Our evaluation of the data in our studies have shown that toxics is a significant problem in the Sound. There are indications that toxics have been reduced some over the recent years but we still are very concerned about its impact on the fisheries. Most of the toxics problems, we feel, as well as the dissolved oxygen problems, are occurring in the western half of the Sound, as was mentioned earlier. We are concerned with certain toxics in terms of their impact on fisheries and ultimately of their impact on humans. We have found fairly high levels of cadmium and PCBs in lobster. We will be working on a management action plan to deal with the toxics issues as well as the dissolved oxygen, and the other issues that I have not spoken about this morning.

I would like to thank you very much for the opportunity to be here this morning. I would be happy to answer any questions.

Senator LIEBERMAN. Thank you, Mr. Fierra.

Now, Commissioner Carothers.

STATEMENT OF LESLIE CAROTHERS, COMMISSIONER, CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

Ms. **Carothers**. Good morning. I am glad to be here. If I sound like I'm talking through that fog out there, it is because I have a bit of a cold which is exacerbating my normal nasal twang. Anyway, I am delighted to be here on behalf of the Department. I have some of my staff members with me to help if there are questions later that I can't answer. We're especially pleased to have this hearing as part of a continuing effort by all of us who are concerned about this to keep this issue in the public eye and to continue to educate the public about the long-term needs.

This year we did not have nearly as much brouhaha about medical debris, partly because there was less of it, and partly because I think we were better able to react to the incidents and respond better. The problems—no pun intended—the deeper problems, like Hypoxia and toxic contamination, remain. What I want to do briefly is not rehash the issues of the study, which my former colleague, David, has done very well, but to talk about what we're doing in Connecticut to get ready for the final study, the final results, and to talk a little bit about what we see as the constructive role this legislation might play in continuing the momentum that the study has established.

As far as the study is concerned, as David has pointed out, we're in the home stretch. We expect by next fall, except for the completion of the hydrodynamic model, to have a body of data that we can start to draw conclusions from and start to develop management plans and by the following year, to have the complete body of work. As I indicated, I'm sure that neither we nor, we hope, New York State, are waiting and just sitting on our hands until we have the information because the preliminary findings that we're all tracking closely do suggest that there are things that we can begin with now.

One of those, as you know is the Norwalk Harbor Demonstration Project to experiment with different pilot projects to reduce nitrogen. We appreciate your support in getting the Project favorable mention in the appropriations committee report. The Project is going to build three pilot plants to explore the technical feasibility of removing 90 percent of the nitrogen year-round. We think this will generate data that will be useful, not only to Connecticut but will generate criteria useful for New York also.

We've also implemented a policy requiring all of our municipalities to consider future needs for nitrogen removal in their facilities plans and designs now in the event that may be required. We're also evaluating the feasibility of achieving nitrogen removal at existing facilities on an interim basis by improving operations. The City of Stamford and the Superintendent of the Stamford plant, Jannette Seamen, have achieved some significant results by operational modifications that have, in fact, reduced a substantial amount of nitrogen. We're looking at whether that can be tried other places and, again, give us a body of data and options for nitrogen removal.

We have—thanks to the action of the General Assembly—$25 million extra to finance the grant portion of some of these nitrogen removal projects and to accelerate combined sewer overflow abatement projects; also to do some harbor studies, estuary improvement projects, and research. We're developing criteria and getting ready to issue those research grants. We're requiring increased monitoring by our treatment plants for nitrogen. Our research vessel is under construction and should be in the water by next summer. That project was part of the Governor's Long Island Sound Initiative in 1987, which is coming to fruition. We're also using research funds from that Initiative to monitor acid rain around the Sound in order to make some judgments about the contribution of deposition to the nitrogen loading in the Sound. So, lots of things are going on.

In terms of the next steps, once the study is done there will be a lot of head scratching and hard thinking in determining what kinds of implementation measures are required. We're obviously going to have to adopt water quality standards for oxygen and nitrogen. We're going to have to develop wasteload allocations, which is going to be very complex. And we need to define an even broader agenda for the long term which includes non-point source evaluation, habitat assessment, land acquisition programs, public access, and a host of additional issues.

From our standpoint, the most positive aspect of the proposed legislation that is part of the subject of today's hearing is that it can provide we think a very needed vehicle for continuing focus for the kind of cooperation that the Long Island Sound Study has engendered among the two regions of EPA, among the universities, among other Federal agencies, and of course, between New York and Connecticut, which are the most critical players from an implementation standpoint. We would like to see some kind of Long Island Sound office at the Federal level that would provide this focus. We have suggested that there ought to be in developing the proposal some kind of role on an advisory basis for the policy committee as well as the current management committee. The policy committee, of course, is currently myself and Commissioner Jorling and the two regional administrators. Although that group meets infrequently, we have had several very substantive meetings to review the progress of the study and to try to make some decisions on priorities. That, we think, is terribly important.

Last, but not least, I do want to mention that the study has not only helped to bring together the public and official entities, it has also been a focal point for helping interested members of the public and advocates to coalesce and to develop coalitions that will serve us well in the future. Again, I think having a strong Federal focus to take over as the study winds down would be a major step forward and would help to assure a future of accomplishment in cleaning up Long Island Sound.

Thank you.

Senator LIEBERMAN. Thank you very much. I appreciate your kind words about the bill. Let me report to you that when we do put the legislation in—I guess we'll do it formally tomorrow—we have included the policy committee, the two commissioners and the two EPA regional heads, basically as the connection between the Long Island Sound Study and the EPA office.

Dr. Weisbrod.

STATEMENT OF ROBERTA WEISBROD, SPECIAL ASSISTANT TO THE COMMISSIONER, NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Ms. WEISBROD. Good morning, Senators. I am Roberta Weisbrod, Special Assistant to New York State Commissioner of Environmental Conservation Thomas C. Jorling. I appreciate this opportunity to represent Commissioner Jorling at this hearing to examine water quality issues of the Long Island Sound and to comment on the proposed Long Island Sound Improvement Act, which we understand will be introduced by yourself and Senators Moynihan, Dodd, and D'Amato.

This legislation is a comprehensive and ambitious plan to provide for continued emphasis on Long Island Sound issues after completion of the Long Island Sound Study. The strength of the bill lies in its provision for focused and sustained Federal involvement, including funding, in Long Island Sound issues through creations of a Long Island Sound office. The office would focus on overseeing implementation and fine tuning the recommendations of the Management Plan and on conducting studies of issues not addressed in that Plan. The office would operate within the current EPA structure but consist of representatives of both EPA regional offices which now have jurisdiction over the Sound.

So long as this new structure has the necessary policymaking authority, we believe it could serve as an impetus for post-study Federal involvement which might not otherwise occur in an agency with other competing demands and limited resources. Thus, we see creation of this office as potentially furthering and building upon the many positive results of the Long Island Sound Study.

Central to the successful operation of the office, however, will be continuation of the structure of the Long Island Sound Policy Committee. Of course, we concur with the State of Connecticut on that point. Under that structure, the States, which have the major burden for program implementation, are co-equal partners with the Federal government, sharing in decisions of program direction and content. We are pleased to see that you have acknowledged that in the new draft of the bill.

We have other suggestions for shaping the mission of the new office. Issues of public access and recreational opportunities are traditionally State issues. When the Federal government does get involved, it is through the Department of Interior and not EPA. We suggest that the resources and efforts of this new office not be diluted by assigning to it those functions for which EPA has traditionally not been responsible and which are more appropriately handled by the States.

The Long Island Sound office is directed to conduct a study of the feasibility of establishing a regional authority to accomplish nutrient removal. We support the intent of the provision but note that subcommittees of the Management Conference are already working with an outside consultant to develop a financial plan for nutrient removal. Among the options being examined are special taxes, user fees, and other funding alternatives. We suggest that the office use this work as a blueprint to devise an implementation strategy. It is not advisable to limit the office's mission to examining the possibility of a regional authority if it is to make the most productive use of the work already on-going under the auspices of the Long Island Sound Study.

Regarding the provision of the bill requiring relocation of the office every five years, it is well-intentioned but would be disruptive to the functioning of the office. We suggest picking a permanent site agreeable to both States and to the EPA. And we understand that Connecticut has the same interest.

We have other suggestions concerning the mission of the office and for clarifying the intent of the legislation which we will communicate to your staff. The only other comment on the bill we wish to offer today concerns funding for the proposed office. The $3 million authorization is welcome and certainly necessary to accomplish the intent of the legislation. However, the long-term success of the post-Long Island Sound Study will depend in large measure on the willingness of Congress to sustain funding at levels necessary to support the activities outlined in the bill.

Turning to the questions posed in your hearing notice, the State of New York is strongly committed to meeting the resource needs of the Sound. We began to address many of the problems illuminated by the Sound study even before they were so uncovered. In fact, New York State first voiced concern over the impact of nitrogen discharges to marine waters in the early 1970s. Nitrogen limits were then proposed and incorporated in some permits for discharges to embayments on Long Island. Hard evidence, however, in the form of water quality data and cause-and-effect relationships was not available at that time to defend the proposed effluent limits.

In addition, New York State included in its submission to the EPA for the initial (1973) and subsequent Survey of Needs for Municipal Wastewater Treatment Facilities, the cost of nitrogen removal from New York City and other New York State municipal discharges to the marine coastal waters. The costs were determined to be ineligible for Federal funding on the basis that data was then not available to support the contention that nitrogen loadings had a deleterious effect on water quality. In 1974, the estimated cost was almost $2.5 billion, and now, as you know, it is over $5 billion.

Pending completion of management plans with implementation recommendations for the Federal National Estuary Programs of Long Island Sound, as well as the New York-New Jersey Harbor, which were also involved in, New York would consider requiring municipal facilities which are in or entering the planning process to investigate the feasibility of nitrogen removal processes. New York also supports the review of existing municipal facility operations to maximize the removal of nitrogen.

New York State has only a very small but intensely developed portion of the drainage area of Long Island Sound. Point source, therefore, as opposed to non-point source, contributions of nitrogen are of primary concern in this area. As a result, over the past two years, New York has been monitoring or requiring monitoring of point source nitrogen loadings from Long Island Sound sewage treatment plants to establish a baseline for future reductions, and to provide data for the water quality model being developed by the Long Island Sound Study. Present concerns for nitrogen stimulated water quality problems in Long Island Sound have been incorporated into research programs for the New York-New Jersey Harbor Estuary programs as well.

Senator, you also asked about the Mamaroneck Action Plan, whose purpose is to address the long standing problem of rain- induced beach closures—which was a great problem on Long Island Sound this summer—an ancillary purpose is to limit the amount of sediment entering the harbor, reflecting another problem which we have to deal with. The causes have been identified and the relative contribution to water pollution and potential solutions are being addressed in a pilot study which involved two sub-regional areas, each several blocks in size, and one of which will be used as a control site. Non-structural best management practices—probably street cleaning, catch basin cleaning, and emphasis on compliance with pet waste ordinances—will be implemented.

Implementation of the best management practices will proceed on a voluntary, cooperative basis at the local level through the Mamaroneck Harbor Action Plan. In addition, the Department has already taken other steps to reduce storm- related discharges to Mamaroneck Harbor. For example, grants have been awarded for infiltration and flow studies in the Mamaroneck sewer district collection area. Via consent order, the Mamaroneck sewer district has been required to correct excessive infiltration/inflow—roof leaders, sump pump discharges, etc.—to the collection system. Finally, completion of the new treatment plant outfall to Long Island Sound will essentially eliminate emergency stormwater overflow to Mamaroneck Harbor. So the Action Plan in a way served as an impetus to make a lot of other things happen. Findings of the Mamaroneck Action Plan could be used to develop technical permit conditions to control stormwater runoff to correct water quality impairments although Federal regulations for a stormwater permit program have not as yet been promulgated.

In the interest of time, I will not discuss New York State's initiatives to reduce toxic pollutant effects—although I will mention that we are near the ending of our pre-treatment program, and I also will mention that we have recently developed a non-point source management plan which will lead to further limitation of the introduction of toxics and nutrients into the Sound. The draft plan is presently under interested public review and will shortly be submitted to the general public for review. We welcome requests for copies and further input by the public.

I will only briefly discuss New York State's habitat protection programs. New York State has experienced virtually no net loss of wetlands in the vicinity of the Sound since enactment of our Tidal Wetlands Law in 1972. We have also purchased wetlands in many areas on Long Island Sound, particularly on Long Island, and we've upgraded our Tidal Wetlands Protection Act.

We recognize that more will need to be done to improve Long Island Sound. The comprehensive conservation management plan for the Sound will fully document these needs. New York State participates in activities associated with the plan at many levels to ensure the plans success. I must beg to differ with Senator Dodd concerning New York State's lack of enthusiasm on the Sound.

Senator DODD. In the past, I said. You're getting better all the time.

Ms. WEISBROD. We have 18 staff members actively working on this project, including myself. The DEC briefs our sister agencies biannually on estuary programs and actively solicits comments and input and tells them where their input is vitally needed. Because we share jurisdiction with Connecticut for the Long Island Sound, we are also striving to maintain close communication and cooperation with Connecticut and the EPA, both through our collaboration on the Long Island Sound Study and through the work of the newly created bi-State Long Island Sound Marine Resources Committee. New York State staff people have already met twice and we plan a third meeting of the principles and we're looking toward a meeting of the bi-State Legislative Commission in the very near future. We will sustain this level of involvement through completion of the study and hopefully through the post-study activities provided in your legislation.

Thank you again for this opportunity to be heard on these very important issues.

Senator LIEBERMAN. Thank you, Dr. Weisbrod. We appreciate the pick up in the interest of New York State.

Before we get into the questioning of this panel, I want to thank all of you who are here today. As I look around the room, this is a very impressive gathering of people who care about the Sound, those who are in a sense full-time environmentalists. I think all of us are environmentalists in some sense. There are a lot of people here from the business community, from the academic community, from government and I thank you for taking the time to be here. I did note the presence of some other elected officials and I just want to welcome them. I saw Councilman Newton here and I think State Representative Smith is back there. And did I see Senator Hampton walk in? Welcome. Senator Atkin is going to testify in a little bit. Did I miss any elected officials? Welcome.

Let me go on to some questioning now of Mr. Fierra.

Mr. Fierra, if you would, just give us a quick report on when this phase of the Long Island Sound Study will be completed.

Mr. FIERRA. As both Commissioner Carothers and I mentioned, they were hoping to have a preliminary plan with preliminary recommendations next fall, and by the fall of 1991 we will have completed all the definitive recommendations, particularly as they deal with Hypoxia. Hopefully, at that time, we will have a good handle on what level of reduction is necessary from the different contributing sources. We will also have recommendations on the other issues, the pathogens, the toxics, and some of the other issues we're dealing with, in the study at that time.

Senator LIEBERMAN. So, we're a little bit behind but not too far behind, is that a fair way to put it?

Mr. FIERRA. That's right. This has been a much greater undertaking than any of us expected when we first started the Study in terms of the involvement in the model and just the tremendous complexity of not only developing two models and trying to get them fit together, but also the data collection has been tremendous.

Senator **Lieberman**. In the report that is issued in 1990, do you expect that you will have a listing of the unfinished agenda? We had a question earlier about what the next phases of the study may show.

Mr. **Fierra**. Yes. I think a year from now we will have a pretty good handle on what we would be recommending in the different areas, knowing full well that there are going to be some things that are going to need a lot more work. As was mentioned earlier, some of the habitat issues and things like that have just not been touched on a lot in this study.

Senator **Lieberman**. What's a habitat issue for our general edification?

Mr. **Fierra**. In terms of dealing with the health of the marine animals and the other species in terms of the viability of their living area and the area for breeding, and what the impact of either pollutants or just man-made activities might have on them, and what could be dealt with in order to protect those areas.

Senator **Lieberman**. Commissioner and Doctor, you talked a little bit about this, but I wonder if you could indicate at this point if there have been any immediate or even measurable results of the cooperation that's been exhibited thus far by the two States in the Management Conference of the Long Island Sound Study? In other words, even prior to the report of the Study, do we see any products of working together?

Ms. **Carothers**. I think you can hear them to some extent from our testimony. We did not collude in preparing it and yet I think you will find that we are on our own initiative undertaking many of the same things. I think there has been very strong and productive cooperation, both at the staff level in working on this Study, and at the management level. You can see by virtue of the fact that we're both looking at interim measures to try to deal with nitrogen at our plants in a similar indicates some joint thinking here.

I do want to add, because I was late and I missed your opening statements, one of the reasons why we in Connecticut are interested in the legislation is that we do want to continue this cooperative relationship with New York. In no way has New York been dragged kicking and screaming into this. On the other hand, when you look at New York State—the size of it and all of its problems, and you look at New York City and its problems—there is no question as a realist that Long Island Sound ranks higher on my list of environmental priorities than it probably does in New York. I think that's almost inevitable. For us in Connecticut, maintaining a structure that keeps us as partners in this is especially important. No less important is one that keeps the Federal government as a partner in it.

Senator **Lieberman**. I think what the Commissioner has said is a relevent point. New York is a big State with a lot of environmental problems. Probably if you asked people in Connecticut to list the most pressing environmental problems, Long Island Sound would, if not at the top, be real close, maybe along side air pollution. So we appreciate your presence, Dr. Weisbrod, because to you New

York State is obviously critical to the solution of this problem. Do you get the same kind of input from Long Island?

Ms. WEISBROD. We are involved in a number of estuary programs, Hudson River, the New York Harbor, New York Bight, we also have the Great Lakes. I will say though that with public interest in Long Island Sound and also interest at the staff level, the Sound probably commands the greatest interest and involvement.

Senator LIEBERMAN. Of all the estuaries?

Ms. WEISBROD. Of all the estuaries. There is tremendous public interest and a very organized group of active people that are involved in Long Island Sound and that sustains it on the staff level. I think one reason is because it was the first one to be begun. We see a pay off. We see things are going to happen. There will be nitrogen removal. We're really looking basically at the cause of beach closures on the Sound. I think the staff interest is very high. The interest in general is high in New York State.

Senator LIEBERMAN. Let me ask each of the three of you a question that I will say at the beginning that I will not hold you to your answer but I'm curious to hear what you'd say at this point, understanding that the Study is going on. When people ask you "where is the problem coming from on Long Island Sound?" I hear some people say the air pollution may be responsible for as much as 25 percent; the sewage is 50 percent; then we have non-point, we have floatables. How do each of the three of you answer that question at this time based on what we know now?

Mr. FIERRA. I think there are many problems in any given estuary. For instance, the pathogens are probably largely contributed from combined sewer overflows.

Senator LIEBERMAN. Why don't you describe what pathogens are for the record.

Mr. FIERRA. It is a bacteria. The standard that we use is a fecal coliform bacteria which is a bacteria that emanates from warm blooded species. It is an indicator of potential viruses. What the impact of this is is that when these levels get above a certain amount—and it doesn't take very much—shellfish beds are closed and, if they get a little bit higher, swimming areas are closed. So I think during storm events, combined sewer overflows are probably a major problem along the near shore.

I think in terms of the whole health of the Sound, I think all of us are convinced nutrients are the major problem. I think both point source and non-point source are major contributors and that's what we're trying to sort out. There is no question sewage treatment plants are a large contribution. We don't know how much non-point source is in terms of its contribution and how to control that yet.

Ms. CAROTHERS. I think David has already stolen most of my answer. If you look at the latest annual report on the Long Island Sound Study, it has an interesting set of graphs that shows at least for nitrogen what the estimated, just estimated, contributions are. The dominant one is rivers—ours, the Connecticut River, specifically—in terms of the estimated nitrogen loading coming from there, which, of course, is sewage treatment plants, is non-point sources, is all kinds of things. The second one is waste treatment plants.

So we do have some idea as to what the contributing sources are. One of the reasons why—and everybody needs to understand—we're waiting for this Study is because, for instances, the fact that the Connecticut River is dumping a lot of nitrogen a little more toward the middle or eastern end may not be affecting the levels significantly at the western end. We don't know that yet and we need the completion of the Study. We also need the completion of the hydrodynamic model, which is the one that is lagging somewhat but is trying to catch up, to tell us just what, as precisely as a modeling exercise can, reductions in particular categories, what kind of results that will have on ultimate water quality. We can identify the source categories, but until we have the full-scale Study, we're not quite ready to say exactly which ones needs to be controlled and how much.

Senator LIEBERMAN. Okay. The first two of you pretty much stated that sewage is really at the top, isn't it?

Ms. CAROTHERS. I would say so because even from the River, a lot of the nitrogen load is from sewage treatment plants.

Senator LIEBERMAN. Incidentally, we're doing whatever we can in Washington to keep the pressure on NOAA to get that modeling study done.

Dr. Weisbrod.

Ms. WEISBROD. I would concur with the other speakers. I would just add that I would keep attention on the issue of protecting the habitat around the Sound. If we're really interested in the resources, that's what we need to do is protect the wetland areas.

Senator LIEBERMAN. Senator Dodd.

Senator DODD. Thank you very much, Joe.

Let me ask you sort of a generic question to begin with about the quality of the Sound today. Would you consider it to be better than it has been in a decade or more? How do you rate it? The tendency, in some people, is to constantly focus on all the things that are wrong—and, obviously, there are many here—but the three of you, in your general opinion, how would you describe the quality of the water in the Sound and the habitat?

Mr. FIERRA. On the Hypoxia issue, I don't think we have enough information over a long period of time to really talk about the trend there. But in the western end of the Sound right now, what we know of it, it is very severe. I mentioned in my statement that in 1987 it was extremely severe, in 1986 and 1988 it was not quite as bad. A lot of that, I'm sure, had to do with different weather conditions and tidal flows and precipitation.

We do have some evidence that shows that the toxics are, even though we still consider them a significant problem, are being decreased in some of the sediments. I don't think that there is any question that this can be attributed to the pretreatment programs that have been in place in both New York and in Connecticut over the last 10 years or so. It is just starting to show up, particularly in the sediments where we can look at trends over time.

I think the combined sewer overflows, whenever they are near a valuable resource such as a shellfish resource or a swimming area, until they are controlled they are going to continue to cause a problem. I know at least Connecticut is putting a lot of effort into hat and I think that as they are beginning to control it, there is oing to be significant improvements in those local areas.

Ms. Carothers. I would basically agree with that assessment.)ur comparative data—I believe it was on oysters—we do have lata from the kind of pre-1970s and now that does tend to indicate, ased on accumulation in tissue, that the toxic load is being reluced, and it should be. We've spent a lot of money and time, and o has industry, working on that. The job is not done, but the trend s down.

Certainly, we've gotten rid of a lot of untreated sewage. We're ow finding that just the treated sewage with the nitrogen load is eaving us a continuing problem. It may be that we're stationary in hat area until we have a nitrogen removal program.

The one thing that I think most people would agree has gotten a ot worse is the floatables question. There is a tremendous amount f trash in the Sound, on the beaches that is washed into the ound. I never meet anyone who is a boater or a user of the Sound vho does not complain about plastic debris, about just general junk nd gunk out there. That is from all of us. If you look at the inrease in the users and the boating population, I'm not suggesting hat they are all slobs.

Senator Dodd. Thank you.

Ms. Carothers. Especially you, Senator. But a good many of us re and I know some of the citizens are organizing to do volunteer lean-ups on the coast. I do think that we need to have—maybe not hrough the Long Island Sound Study but through our own organiations—a heightened educational campaign that what individuals lo does matter. Just the increasing use is bound to result in an inreasing marine litter problem unless we all do our part.

Ms. Weisbrod. Let me speak a few words from my perspective of eeing what's happening on New York Harbor. There we can make very clear statement. New York Harbor has absolutely improved 0 years, 20 years, 10 years, even the last 5 years we've seen contant improvement. It started from much lower down, I'd say the ound—if I have that oversight, which I think I do. We've seen a reat increase in abundance, diversity, and sensitive species returnng to New York Harbor. The Sound really never deteriorated that adly and we're holding our own and fighting back.

There are two other things I just want to add and would be emiss if New York State didn't mention them. First, the combined ewer overflow abatement program that we mandated that New 'ork City begin in 1982: They've begun it and they are in the econd phase of it. They have $1.5 billion budgeted in the 10 year apital grant. So we see that in a few years we will see combined ewer overflow abatement projects. Of particular interest in the ound is the Flushing Bay abatement program in which there will e a very large holding tank to hold the overflow sewage after a ain storm.

With regard to floatables, it is a problem. Again, the perspective vith the Harbor, it is not nearly a problem that it was in the Iarbor. There has been a massive effort in New York Harbor with loatables and our preliminary findings and results indicate that he effort has actually paid off. We've collected a lot of debris with he prisoner shoreline clean-ups, the Army Corps of Engineers vessel clean-ups—it was a floatable work program—and we've collected hundreds of tons. In the Beach Clean-up Day this year, we had about 30, and half of them were on the Sound in New York State, we saw much less debris. We do see a difference.

Furthermore, in a floatables action grant that we applied to EPA for out of the Harbor Program for New York State, two of the demonstration projects will be on the Harbor, per se—actually, one in Sheepshead Bay and one in City Island, which almost looks to the Sound—and the third will be in a site on Long Island Sound on Long Island. These demonstration projects will encourage boaters to use waste receptacles. Many municipalities do not have waste receptacles for boaters. It is not mandated even though it is Federal law. We will make sure that that happens, we will encourage boaters to use the waste receptacles and also to do recycling and vessel waste reuse. So we are trying to make a stab.

Senator DODD. The general conclusion, because so often regardless of the issue, the headlines are doom and gloom and we're spending more money, and is anything ever going to get fixed, and I think if I heard all three of you correctly there is every reason to be extremely optimistic. Things are improving. We still have some problems that obviously have to be dealt with, but clearly things are certainly better than they have been in the past and we're on the right track. I don't want to overstate the case either and engage in sort of a Pollyanna approach here. But I do think it is important that people get some sense that their efforts—both personal and what's being done at the State, regional, and Federal levels—are making a positive and constructive contribution and we are getting a handle on this issue. Is that overstating the case?

Mr. FIERRA. No. I think that states it very well. The only thing that I would caution is that, as you stated earlier, there is tremendous growth occurring in coastal areas and right now we're working to catch up with the present population. We've got a lot of problems. The impact of that growth is just going to exacerbate that. I guess it is a caution that we may be running awful fast to just stay in place if we don't deal with some of that growth.

Senator DODD. Let me ask you, and it has nothing to do with waste treatment facilities and the like or floatables, we've all watched what happened with the *Exxon Valdez* in Prince Edward. In many ways, this is a more fragile and dangerous area I suppose because there is far less flushing here than there is up there. What steps have been taken by region I EPA to coordinate with the States, particularly New York and Connecticut, to deal with a clean up? One of the real complaints was that when it occurred in Alaska, despite all of the claims that they had these terrific plans in place, frankly, very little was in place and they sat around for days looking at each other trying to figure out whose responsibility it was to move. What steps have been taken here to minimize that kind of thing occurring, God forbid we should be confronted with an oil spill of even lesser size. How fast can we respond? How well are you prepared to deal with that kind of an issue?

Mr. FIERRA. This is not in my area of responsibility but I do know a little bit about it. Certainly, something like that raised everyone's conscientiousness and I know our region went back and is working with the Coast Guard to take a harder look at the response plan that does need to be put in place. Maybe a way of better answering this question is not long after the Exxon Valdez there was a spill off of Narragansett in Narragansett Bay. I think it was 290,000 gallons of fuel. From what I understand, there was tremendous cooperation, immediate cooperation from the Coast Guard, the State Environmental Agency, Department of Environmental Management, and the EPA people. I guess it was considered a real success in terms of the people operating together. Interesting enough, the staff level people that coordinated the response to that out of the Rhode Island office were the people that operated the Narragansett Bay Estuary Project. They had all of the networking that had been done through the Estuary Project and it helped enhance the involvement. It actually saved the Bay. It helped an awful lot in terms of the public volunteer effort there. There was a ready made group that just moved right in. So I think something like the Exxon Valdez certainly should not have occurred and we certainly should pay a lot more attention to making sure it doesn't occur. Or when something like that occurs in those kinds of conditions, we're not equipped to deal with it, we or the industry. I don't think there is any secret about that. That could occur. It has occurred off of Nantucket. There was a spill there about 10 years or so ago. Very serious consequences.

Senator Dodd. Do you feel satisfied that we're ready?

Ms. Carothers. Well, the Governor didn't, more to the point. We have taken a look at this issue both from the standpoint, as you know, of making recommendations to you and Senator Lieberman about things that the Federal Government might be doing but not leaving it to either that or to regional cooperation. We found when we did the study that the Governor directed us to do that there were things that we could do to tone up in this area. We needed stronger regulations of our terminals, which we're in the process of getting out, and that we needed to have more dedicated staff whose primary focus was prevention and not just response. We have excellent response capability in Connecticut but you tend to get a little slack on the preventive side until something like the Narragansett Bay problem or a Valdez wakes you up.

We found a couple of areas where we felt we needed our own equipment. We decided we needed our own skimmer because we did not think with the best of intentions it could be deployed from New Jersey or the Gulf Coast—which is I believe where the Coast Guard has most of its equipment—in time to help us. You are absolutely right, all you do is look at the map of the Sound and the flushing question—I mean, once the oil gets in there, it is likely to go to the shore and not back out again. We have to be ready to deal with that on the State level. We are working with EPA and the Coast Guard on the contingency plan, both for ourselves and for them, but certainly there is more that can be done.

Senator Dodd. Joe has introduced a bill that asks for this kind of a thing in order to make contingency plans. I think we need to get that and have that as soon as possible. I really think it's important.

Ms. Carothers. I would agree that it is important because there are cases where you do need to pull people and equipment and resources from other regions, as was done in the Narragansett case. We sent response personnel to Boston to the staging area to be ready to go if they were needed. I'm sure there is more that can be done.

Senator Dodd. Dr. Weisbrod.

Ms. Weisbrod. The State of New York has sent staff to work with the Captain of the Port at New Haven, in particular, as well as the Captain of the Port in New York. One of the things that we've done and provided them with is to identify environmentally sensitive areas and areas of vulnerability on the New York State part of the Sound. By areas of vulnerability, we've identified those areas which are adjacent to large storage tanks for oil and also where there is a lot of oil traffic. With that information, we intend to recommend staging of booms both on the Federal and local level.

We also have taken this opportunity of working with the Coast Guard and of reviewing our own house and how effective we are in responding. Also each part of the State has their own regional oil response teams and we've reviewed their operations and the communications. Also we've asked that all local entities on Long Island Sound provide us with information as to their capabilities in responding to an oil spill. So we're looking at those resources as a way to help the Coast Guard. We've also communicated on the staff level with Connecticut counterparts. It is a real problem. I have to say that you've touched on something very serious.

Senator Dodd. This is not a question of if it is going to happen. It is going to happen. And the question is, How are we going to respond to it? Will we be sitting around holding a hearing wondering why we didn't have something in place.

Ms. Weisbrod. There is a lot of oil that comes into the Sound and if there would be a spill, it would spread very rapidly.

Senator Dodd. And you've got 600 miles of coastline in here and you'll be spending the rest of the next decade trying to clean it up.

Ms. Weisbrod. It's a very environmentally sensitive area so it is a real problem.

Senator Lieberman. Thanks for that, Chris. Just to stress, as Chris indicated, that this bill, the Long Island Sound, does have a section in it that requires a report to Congress on contingency plans for an oil spill in Long Island Sound and if the Sound office finds that those plans are, in its judgment adequate, then recommendations about how we can upgrade them are called for. So hopefully there is some mechanism here that will deal with that as well.

I am very enthused about what I understand is the beginning of an effort to have joint permitting between New York and Connecticut, hopefully moving toward some sense of common standards for the two States. No matter on which side something is located, it affects the Sound and affects both States. I wanted to ask you about that but I don't have time. I just want to congratulate you on making that initiative. We look forward to working with you and thank you for your support of this bill.

Senator Dodd. And keep up with the public awareness. I think that's very important. I would like to think that the fact that the amount of floatables are down has been because of the interest in what happened in 1987 and people paying far more attention. I'll tell you, as someone who sails that old Friendship sloop of mine around these waters, it is frightening sometimes to see what comes floating by.

Senator **Lieberman**. Yes. And that's us, right. I mean, that's the old Walt Kelly line, "We've met the enemy and he is us." We're the source of the floatables.

Thank you all very much.

Let me invite the next panel up. As you come forward, I will introduce you. This panel shifts from government to citizen. We're going to hear first from our own Connecticut Soundkeeper, Terry Backer, on the perspective of fishermen and the role citizens can play in monitoring compliance and enforcement efforts. Then Chester Arnold, who is the public education coordinator for Connecticut Sea Grant and chairman of the Citizens Advisory Committee of the Long Island Sound Study, he will take us through what the Study has accomplished thus far in citizen outreach and education and where we go from here. Jim Leahy is the executive director of ConnPIRG and will present the preliminary findings of ConnPIRG's compliance report for the State of Connecticut and will testify to the need for creating a political will to accomplish some of the hard choices that we have ahead of us yet. Mr. David Miller is the regional vice president of the National Audubon Society and joins us from New York. David is going to outline some of the initiatives of the Audubon Society and advise us on the role that environmental groups might play in organizing communities into action.

Without further ado, I am proud to call on Mr. Terry Backer, the Soundkeeper.

STATEMENT OF TERRENCE BACKER, EXECUTIVE DIRECTOR, THE SOUNDKEEPER'S FUND

Mr. **Backer**. As you pointed out, I am a fisherman and I'm also the Soundkeeper. My family has been fishing on the Sound for a long time. We know the Sound for the habitat it once was and hopefully it can be again. But there is a long way between now and then.

You can't adequately comment on the proposed bill—at least I can't—without telling you what I see. I probably spend more time on the water than anybody who is concerned and working on Long Island Sound issues, in fact, I know I do. It is not unusual to see sewage in Long Island Sound, large rafts of it floating down the Sound, running for mile upon mile, with human waste bobbing in the waves. That is something that I see. Ladies tampon applicators, condoms, syringes, those are things that are in the water. Those are the things that I see. I've seen the Sound turn chocolate brown for 50 percent of its length with plankton blooms, fueled by 350 billion gallons of sewage discharge.

In order to straighten out all these problems, I don't think there's any magic agency or magic office that's going to pull it off. Certainly it is apparent to everybody that the Sound is fragmented. We have the DEC, we have DEP, we have the two regions of EPA, and there doesn't seem to be a steady hand at the wheel anywhere. There doesn't seem to be one central office directing what's going on or examining what's going on. I think that's sorely needed. So, I came here today to support this proposal because I think we need someone at that wheel. I think the regional office of EPA for Long Island Sound might pull it off.

Senator **LIEBERMAN**. That's exactly what we hope will happen. You said it a lot better than we did.

Mr. **BACKER**. I think I'll just end my opening statement there and let these other guys take a shot.

Senator **LIEBERMAN**. Okay. Then we'll have some questioning. Chester Arnold will be our next witness.

STATEMENT OF CHESTER ARNOLD, JR., PUBLIC EDUCATION COORDINATOR, CONNECTICUT SEA GRANT PROGRAM

Mr. **ARNOLD**. I've been in a lot of meetings with Terry but I've never followed him directly. He's a tough act to follow. I just want to clarify that I am here representing both the Connecticut Sea Grant Program and within the context of our work in the Long Island Sound Study. We're just entering the third year of the organization of the public education and participation activities of the Study.

In terms of the bill, I am very supportive of it. I think it is very important for people to realize that the management plan of the Study is just the beginning, it is not the end. I think it is natural after a five year period or six year period in a long-awaited document like that that people kind of heave a sigh of relief that now we have the plan and everything is solved. As the other panelists pointed out, it is really just a springboard towards cleaning up Long Island Sound. I think a Long Island Sound office or its equivalent would be an excellent step towards ensuring that some of the work of the Study does not go for naught. I'm also personally particularly gratified to see the provisions in the bill to address many of the issues that were not chosen for specific study by the Long Island Sound Study but that are nonetheless crucial to the management of the Sound, including all the wetlands and the coastal land use issues that were mentioned and that Terry is so interested in, and also, of course, public education.

In terms of our program, I'm going to reserve most of talking about our program to the annual report that I've submitted to your staff people and to anyone else interested in it. As I said, we're starting our third year. We have the two Sea Grant offices that we work out of in Connecticut and New York and two public participation coordinators, both of whom are here today—Cathy Rhodes and Melissa Barriston. We've put out something like 62,000 fact sheets, we've done public service announcements on radio and television, we give many talks, and we work with the press and elected officials. We also work with the Citizens Advisory Committee, which is made up of 37 representatives of organizations around the Sound. I'm not actually the chairman, I help to staff the committee, but they are a viable committee in their own right.

I think if there is one thing I can summarize that we've done it is we've provided over the two years a reliable, accurate, and responsive source of information to all the other groups that are working on Long Island Sound. Obviously, it is too big a job for us to do alone and we are a very limited program within the context of the Study. So I would like to concentrate the rest of my talk to the needs for the future.

Basically, there are four areas that I think are very important areas that need to be addressed and also areas that could be done within the purview of this Long Island Sound office.

1. Marine education and just generally environmental education in the school system. As I travel around speaking, there are a lot of teachers out there that are very interested in doing environmental education, specifically Long Island Sound studies. They don't need complete financial support, they just need some support in the way of a few materials and some guidance. We need to create a sense of stewardship of the Sound and the schools are the best place to do that.

2. Urban areas around the Sound and the upland areas to some extent. The greater majority of the people in the watershed of the Sound are in the urban areas around the Sound and they are admittedly a much tougher audience to reach. They have a lot of other problems that are high on their agendas. Yet we really need to reach these people and at least give them a sense of what the health of Long Island Sound would mean to them in order to be ultimately successful.

3. Local officials. I can't stress enough how important the education of local officials at the town level and even the county level is. This applies not only to the elected officials but to the municipal commissioners as well. I was at a meeting on non-point source pollution last week and a gentleman from the DEP made a very good point that million dollar initiatives by the State and the Federal government can be undermined by bad land use decisions at the planning and zoning level in individual towns. These people cycle through very rapidly and I think we need to have a regular training for them on Long Island Sound issues.

4. I was also very gratified to see the public education grants in your bill, Senator Lieberman. There is a very successful program at Puget Sound called the PIE Fund, Public Information and Education. They've given out $1 million so far to various groups to do local projects. This is where in my eyes public education becomes implementation. If it is a Boy Scout Troop doing hazardous waste collection or farmers making a video tape to teach other farmers how to control their non-point source pollution—that's really implementation, especially of non-point where enforcement is going to be very, very difficult in the traditional sense. We're going to have to rely on voluntary compliance, not even at just the local level, but at the individual homeowner and farmer level. This is where public education can really make a contribution.

In summary, you've noticed that these four areas that I've outlined are all education. Terry is very fond of telling me in meetings that education is not the whole story and I totally agree with him. It is not the whole public involvement story but it is the foundation of all the other actions that these three gentlemen on my right are doing. They wouldn't be able to operate without this foundation of education. Nor can brief spikes of public awareness substitute for public education. A lot of people running around being worried about getting AIDS from walking on the beach, it might temporarily swell the ranks of Long Island Sound supporters, but in the end, it is not going to get us where we want to go.

The last point is that education can provide a positive message, as you mentioned Senator Dodd. Sometimes when you talk about environmental issues everything gets a little bit heavy and a little bit negative all around and that's natural. But education can provide a positive message in counterpoint to that. I think that any endeavor, especially this Long Island Sound Office, that is working in the best interest of Long Island Sound for the future should incorporate public education on a level equally important as any of the technological issues. Otherwise, it is bound to be a transitory effort.

Senator **Dodd**. I applaud you for that. This is what I was driving at and I want to hear your comment on it. People need to think they are winning something. You clearly have to identify the problem, but nothing succeeds like saying we're actually getting something done. That brings people out and they get more involved if they think that you actually do something that will have a beneficial effect. That's why it is so important I think. I'm impressed with your four points there, Mr. Arnold.

Mr. **Arnold**. It is very disheartening to hear people come up to you and say that Long Island Sound is dead or why even bother, it's hopeless. It is a fine edge to work between letting them know the problems and depressing them too much, but it needs to be done.

Senator **Dodd**. I agree.

Senator **Lieberman**. Next we have Jim Leahy from ConnPIRG. Thanks for being here.

STATEMENT OF JIM LEAHY, EXECUTIVE DIRECTOR, CONNECTICUT PUBLIC INTEREST RESEARCH GROUP

Mr. **Leahy**. Thank you Senator Lieberman and Senator Dodd.

First, ConnPIRG is a State-wide environmental and consumer advocacy group. There are about 35,000 members across the State of Connecticut. We strongly support the proposal outlined in the Long Island Sound Improvement Act. It allows the framework for the necessary cooperation through the extension of the management conference. More importantly, what it will do is also demonstrate commitment to the residents of Connecticut and New York by the Federal Government, a long-term commitment toward solving the problems of Long Island Sound. I think we're all convinced that the Long Island Sound Study is going to come out with some very solid recommendations as to what we need to do. It is also a certainty that if we don't follow these recommendations and try to implement them, that's a violation of the public trust and the public has been looking forward to this Study for so long.

I don't want to take my time to talk about the specifics of the bill. What I would like to talk about is ConnPIRG's unique position in this whole debate. We run door-to-door canvasses in every corner of the State year-round. Last summer, we knocked on close to 200,000 doors across the State of Connecticut. It is primarily for the purpose of public education, membership building, and fundraising. But one of the other things that it does is it allows us to get a pretty good sense of where the average Connecticut resident stands on a lot of the issues that we talk about. It is a very informal setting, you're standing at their door and they are very free with their feelings, as you could probably guess.

Senator Lieberman. We've been through that experience of the door-to-door campaign.

Mr. Leahy. We just heard from Senator Atkin that we came to his door and he said "no," but we'll still look for his vote next year.

During the summer of 1988, ConnPIRG was working on the Clean Air Act—I know that is something you're both very familiar with—and while the response was the best that we'd ever had to that point, the real amazing part of the summer was that regardless of who you talked to their second question was, well clean air, that's important, but what are you doing about the Sound. It wasn't just a coastal issue, it was throughout the State of Connecticut. We have offices not just in Norwalk and New Haven, but in Hartford and in Storrs. And the depth of that interest impressed us tremendously. While we continue to work on clean air at the national level, this is part of the reason that we've made Long Island Sound our top in-State priority. It was very obvious that our constituents were very concerned with the problem, the visceral reaction that we got from people at the door was stronger than in any place where I've run an office and for the last four years I've run them up and down the east coast. That was impressive because I think it is that will which we need to make the kind of changes that we're talking about making. These are going to be difficult changes, we're not talking about easy solutions, we're talking about billions of dollars, we're talking about lifestyle changes. I am very confident from knocking on doors now and talking to people that the will is out there in the public to do this kind of work.

Some people's perceptions are stronger than others. Obviously, if you are down near the Sound people are more aware of the complexities of the issues. Sometimes in-State you get a lot more of the, oh, yes, that medical waste that I saw floating up on shore. Most seem confused because I think unlike most environmental issues, there is no tangible enemy when you're talking about Long Island Sound, it is us. Yes, there is industrial dumping, and yes, there is sewage discharges, but we're really the only ones we have to blame for a lot of this and we need to figure out how to battle that. As environmentalists, we struggle with that a lot because we always pick out a target and fight Them and try to beat Them. As you say, it is easier when you have a victory, when you have something you can shoot for, it is always a lot easier to make change.

The overwhelming reaction right now is frustration at the inability of anyone to develop a comprehensive plan to tackle Long Island Sound. They see it as a topic of political debate but very seldom followed by action. Again, people want to see a true commitment to solving these problems and I'm not sure that they are particularly worried about the cost. I think they are going to get used to it, they will deal with it. But one of the most surprising things to us was that across the State I don't think as many people are aware of the Long Island Sound Study as those of us who deal with it, decision-makers and those of us who try to influence decision-makers, or those who live right along the coast. I think it is important that we try to find a way to expand the reaches of the Long Island Sound Study to make this something other than a coastal issue. As long as it is a coastal issue, the support is not going to manifest itself in the way that it truly could and in a way which could make the political decisions significantly easier.

This frustration hasn't led to disempowerment, which I think is very important. As I was telling Barbara when I was in D.C. last week, we signed up over 10,000 new members to ConnPIRG this summer and that's more than we've ever done before. A lot of that was very specifically because we committed resources to working on Long Island Sound. We had people walking into the office saying, I saw your ad, I want to do something to save the Sound, can I help. That's never happened before. So despite the frustration, despite this inability to take steps, people are still ready to do it. I think sometimes they get a little disempowered, sometimes they seem overly frustrated, but if people come up with good solutions, I think it is going to work. Right now the public education done by the DEP and citizens groups, the Soundkeeper, the Connecticut Fund for the Environment, that Connecticut coastal coalition which was just found, these also are very valuable roles. I think one of the greatest things about the extension of the management conference and the office will be that there will be a central point to look at and when people don't know where to go or what to do, there will be a clearinghouse that they can deal with.

I was asked to respond to the question does public outreach as currently practiced achieve cleaner waters. The simple answer is yes, although it is difficult to make it a simple answer. Between the grassroots lobbying efforts which are bolstered simply by this public outreach, the citizen suits which I think Terry filed early on and CFE continues to do, these changes would not have happened without the public outreach that we work on. We really need to get this strong message to more people that they can get involved and really help. The effort must be a joint venture—it can't be environmentalists fighting industry. I think we need to pull each other along on this one and realize that the vital resource that Long Island Sound is, if we don't work together we're going to waste far too many resources to really make anything work.

Finally, just to comment briefly on our study, which unfortunately is not coming out until the 23rd of this month, we've done an in-depth study of NPDES and State level permits and violations for the last two years. Everybody here realizes that DEP has increased their enforcement of violations of permits extensively over the last couple of years. The one thing we can look at right now and say with certainty is the number of violations are still significantly too high. Again, when you're looking at funding mechanisms for the program, this is something we're certainly going to need to look at and hopefully we can bring them back into compliance. If the DEP continues to increase the enforcement work that it has, I think that will happen. You will all get copies of that report when it comes out and, again, it will be just in a matter of three weeks.

Thank you.

Senator LIEBERMAN. Thank you, Jim. I think your testimony is further evidence of the fact that people want the Sound cleaned up. There is a real reserve of support for what we're doing. I saw a national poll a while back where they asked the question in the toughest way, which was: "Are you interested enough in better environmental protection to pay more for it?" Eighty percent responded to that question saying, "Yes."

David.

STATEMENT OF DAVID MILLER, VICE PRESIDENT, NORTHEAST REGION, NATIONAL AUDUBON SOCIETY

Mr. MILLER. Good morning. Thank you for holding this hearing. Being a resident of New York and a native of Connecticut, I am happy to speak on Long Island Sound.

Senator DODD. Come on home. All is forgiven.

Mr. MILLER. I represent our members in both States. The National Audubon Society has 580,000 members and 550 chapters nationwide, and close to 30,000 members and 20 chapters in Long Island Sound watershed. We've established a Long Island Sound Committee within Audubon with delegates from those 20 chapters and also members of our Scientific, Regional, and Washington staffs. We're working on a citizen hearing and mobilization campaign for next year and we're also actively involved in the Long Island Sound Study and the CAC, the Citizens Advisory Committee to that Study. So the restoration of the Long Island Sound ecosystem is a priority of our members in Connecticut and New York and foremost in the minds of the entire Society.

As speakers before have identified, Long Island Sound is in trouble with issues that are far-reaching and complex, warranting a comprehensive and coordinated approach to its clean-up and future protection. While we're hopeful that the Sound Study will provide an extensive blueprint for the Sound, the true Litmus test will be the political will and action by our Federal, State, and local officials to implement the plan. Major budgetary, programmatic, regulatory, and coordination commitments will be needed throughout the 1990s.

I am going to summarize most of my statement today and just hit on some of the high points. I would ask that the whole statement along with Audubon's Long Island Sound Committee's platform for the Sound be entered into the record.

Senator LIEBERMAN. We will do that. I thank you for going at it in that way.

Mr. MILLER. We view the legislative initiative before us today as a step in the right direction to the coordination and comprehensive clean-up of Long Island Sound. The National Audubon Society strongly supports and welcomes the legislative initiative called the Long Island Sound Improvement Act of 1989. Through the creation of a Long Island Sound Office within EPA, the coordination needed to implement the Sound Study and CMP, Comprehensive Management Plan, is firmly established. Other regions of the United States have obtained great success from this model. A Long Island Sound Office within EPA can help coordinate activities to restore the Sound, report on progress made to implement plans, and monitor existing programs for the Sound clean-up. The other models I mentioned, located in Chesapeake Bay and the Great Lakes, have been instrumental in moving the restoration efforts of those two water bodies further ahead than any comparable estuary or fresh water ecosystem in the country. These offices have provided a focal point for discussion, a magnet for grant funds critical to the implementation of restoration efforts, and a catalyst for formal governmental agreements to move the clean-up agenda even further.

Senator **Lieberman**. If I may interrupt you. I really appreciate your mentioning that because clearly the question was what's the time table. It is very important that we see the creation of this Long Island Sound Office in EPA as not just another step that we're taking because we have to do something, but the fact is that in the two cases where this has been done—in the Chesapeake Bay and the Great Lakes— it has produced real results and obviously we hope it will do the same here. So I appreciate your reminding us of that.

Mr. **Miller**. And along those lines, all those problems in those areas aren't solved, but some of the problems faced here in Long Island Sound have been addressed in a greater magnitude in the Great Lakes and the Chesapeake Bay and they are further along in solving some of those problems. While some issues are still there and remain unsolved, the progress in moving forward toward that goal has hastened greatly.

I think along this line, the Act also includes the themes of accountability, coordination, and implementation. With proper financial backing, the specific recommendations that come out of the CMP and the related efforts within the Act the office can provide, our collective clean-up initiatives will be a resounding success. The office can provide the mechanism to ensure that our Sound studies and plans will not just remain on a series of distinguished shelves but will be put into action.

I would like to agree at this point with the State representatives from New York and Connecticut on the location of the office. We should look at one location and choose that location based on a set of criteria that EPA and the States of Connecticut and New York could put together. If this office is to be successful, there will be many types of grant programs and funds that go forward that will provide benefits to both States. So I think it is very important that we don't let the location of the office become at all political or politicized because I've seen in other areas where this has happened it has killed the initiative to create such an office.

The completion of the Long Island Sound Study, the creation of the Long Island Sound office, and the implementation of the management plan are supported strongly by the public. The public will for action is growing. Throughout my travels, whether Audubon chapters, other organizations, and even family or social gatherings, Long Island Sound is the issue in Connecticut and on the New York shores of the Sound. I find the public sentiment has always been ahead of legislators in protecting the environment. But recent polls even surprised many of us in the profession. In June a Gallup Poll reported that the environment was a national priority. Of those polled, 97 percent called for more programs to curb pollution. And as the Senator mentioned, over 80 percent are personally concerned about the condition of our coastal waters.

Audubon sees one of its roles as a catalyst to shorten the gap between legislative action and public sentiment. The more we can document the public's concerns and get them involved, the faster the political process can react.

To conclude, I would just like to mention that the National Audubon Society, our State councils and chapters look forward to launching our Citizen Hearing Project in 1990. Through working with many of the organizations here today on the panel and in the audience, the National Audubon will host 12 to 14 citizen hearings from Mystic to the North Fork of Long Island between Memorial Day and the Fourth of July. This is based on a model of a similar program we did in the Great Lakes several years ago. Our hope is to have every possible organization, concerned citizen, elected official express their view on what needs to be done to restore the Sound. Once completed, Audubon, in consultation with an advisory group of conservation groups, will pull together all the testimonies and put together a Citizens Agenda Report to EPA, State agencies, and elected officials. Hopefully this process will make your jobs easier in fighting for Federal funds to clean up the Sound. In the interest of time, again, attached to the testimony is a several page project description for your review. We would hope that you would be involved in those hearings as well as your colleagues and assist us in this effort next summer. Together we have the desire, energy, and collective powers to restore this magnificent resource.

Senator **Lieberman**. Thank you, David. The truth is that the support that your groups and citizens generally give us, and as people do here in Connecticut and New York, is invaluable to us as we fight for resources in Washington because you show that it is not just us, it is clearly of public concern.

Senator **Dodd**. I would like to get your assessment of how the Long Island Sound Study is going—that from all four of you. One of the questions raised by one of the people in the audience at the outset of this is whether or not it is going to be done in a timely enough fashion or whether we're going to be ending up with a lot of nice recommendations that are going to be behind the curve, so to speak.

I think some of you mentioned that there are certain aspects of the Long Island Sound Study that did not cover certain problems. For instance, in 1985 no one was talking about medical waste. We had the problems in 1987 and there has been language adopted by the Congress to prohibit medical waste dumping in these waters. What are some of the areas you'd like to see picked up by the Sound Study that would not in any way retard it's conclusions so we can get about the business of working on it. Just give me your general assessment. We will begin with you, Terry.

Mr. **Backer**. I think it would be difficult to add anything to the Long Island Sound Study without retarding its conclusion.

Senator **Dodd**. But should there be some things done that would make it a more worthwhile Study? That's what I'm sort of getting at.

Mr. **Backer**. I kind of think that we have habitat issues that are not addressed by the Long Island Sound Study, access problems around the Sound that are not addressed by the Long Island Sound Study. The Study is limited because it is more or less a loading Study and it doesn't look at the diversity of Long Island Sound. The problems come more from loadings. We have other problems of loss of habitat. That's why I was excite by the EPA regional office, because it was an office that could look at all these things. The question that came to my mind regarding the EPA office for Long Island Sound is how far in-land—and I couldn't pick it out of the bill—would this office address. How far would they look in-shore where most of our problems come from. So I'm throwing another question back. Answer it at a different time if you'd like.

Senator DODD. Good point.

Mr. LEAHY. Terry and I spoke about that earlier. The compliance report that we're working on actually looks at rivers in Connecticut because all of them obviously run down to the Sound. One of the things that we would certainly encourage would be to move up the boundaries of the Long Island Sound Study. A lot of the non-point sources are in-land and a lot of the industrial discharges are in-land and we need to look at the effect they have.

As far as other issues, I think one of the greatest things about this bill is the unfinished agenda and the idea to target those issues that are spelled out pretty effectively in the bill. There are so many different issues with an estuary as complicated as Long Island Sound. It shouldn't be the subject of a five-year study. It should be a continuing process and I think if this bill works as effectively as it can, that's exactly what this would accomplish and that's what we hope for.

Mr. ARNOLD. I have little to add to those comments. I think they both pointed out that the Study needed to be focused, it needed to focus on a couple of priority problems, and it has done an excellent job of that. It wasn't meant to address the whole sweep of problems. So when I said that I wanted those other issues to be addressed, it wasn't a criticism of the Study. I think the Study has done an excellent job and perhaps the biggest success of the Study is the cooperation between the States that the other panel was talking about.

I also would agree with Terry that issues of habitat protection, coastal land use, better coordination between water quality programs, essentially like the Study, and land use programs, like our coastal zone management programs, is probably one of the big areas that is needed to be addressed in the future.

Mr. MILLER. I would just like to say that the Study, if you expanded it too much more, and I agree with the other panelists, you would lose the effectiveness of the Study and the focus. But I think one area where it has been flexible and important is in the finances. They are now looking into the necessary finances of the Study to implement the recommendation, and that's going to be critical. Because in 1991 we need to be in a position not to wait another two or three or four years to implement those recommendations, but to implement the recommendations when they happen.

The other aspect—and I applaud the bill in looking at the unfinished agenda—is there are some unfinished agenda items that are going to take time to solve. Atmospheric deposition. We find in the Great Lakes and other areas, that it is a major problem and we need to assess it better on Long Island Sound. Of all the PCB's entering Lake Superior, 90 percent come from the atmosphere, 50 percent on a lake-wide basis. So these are the types of problems that we have to start looking at on Long Island Sound. Contaminated sediments, another problem and again, this office can provide some leadership in addressing an issue like that. In the Great Lakes, the national program office within EPA has a grant program to do demonstration clean-up projects and core sampling of contaminated sediments in harbor areas in the Great Lakes. Five were picked for the demonstration projects, but 42 harbors have contaminated sediments. Those types of initiatives in time could come from the office that you are creating today but I don't think they would come unless we had such an office.

Senator DODD. This was not a set up deal—people are going to think we orchestrated this line of questioning—but my next question has to do with the financing. Inevitably we can get everything done and then the recommendations are going to come in with a price tag on it, we've talked about some numbers here today. One idea kicking around—this does not come from Senator Lieberman or myself, but just so you get some idea—we've asked people about funding sources and it is something which you might equate along the ideas of a Long Island Sound Super Fund where there would be a 1 percent assessment based on development as a way of creating a fund to deal with some of these costs. Now that's going to be a highly controversial suggestion I can tell you because of what it would mean. I wonder if you might either comment on what you think of that or, if you're not prepared to do so today, maybe you'd like to submit a response to that question. But I presume some of you have heard about it already and have some views, what are your thoughts on it?

Mr. BACKER. The proposal has floated around on a number of different issues, whether it was buying up open space on Long Island Sound, I personally like the idea. I think there is a lot of real estate trading going on, I don't know whether you need a real estate conveyance tax or a development assessment, I'm not really——

Senator DODD. I don't think it has really been nailed down yet, but obviously there is a business impact here.

Mr. BACKER. There is trading of billions of dollar buildings down in New York everyday. One percent of that would certainly help a Long Island Sound Fund. New York City discharges the lion's share of sewage into Long Island Sound. Locked up in its discharges are metals A to Z, you name them, 3,000 pounds, 4,000 pounds daily are discharged into the waters of Long Island Sound and the Hudson River. We have fish we can't eat because of those things. We have health advisories on stripped bass and blue fish. The development is what causes a lot of these problems and I find it perfectly fitting that they help pay to solve some of those problems.

If I might, I would like to add at this time, I know that in the bill you talked about taking some money from citizen suit litigations, awards by the court, and putting them into the Long Island Sound.

Senator DODD. In equal value to those that are collected, I think is what the bill says.

Mr. BACKER. Well, I think it is a terrific idea. There is another side to that coin. Many of citizen suits that are brought are settled out of court. There is a current Justice Department policy that allows the Justice Department to attach some of those penalties—they can attach that and say we're taking 50 percent, we're the United States Justice Department, we're taking all of the future stipulated penalties for these violations because we're the United States Justice Department. I would find it fitting that the Justice Department attachments go to the Long Island Sound Fund.

Senator **Dodd**. It's a difficult problem, I'll tell you, Terry. I chair the subcommittee on the securities industry. The SEC collects from the securities industry millions of dollars every year, I mean, just from Bosky alone I think it was $800 million. The budget for the SEC is about $170 million a year. They would love nothing more than to get their hands on the fines that they collect. I agree with your point, at least some part of it could come from that direction, it would certainly help.

Mr. **Backer**. I am often confused, the Justice Department comes in after tedious settlement negotiations have gone on for years, and they say, hey, we're taking 50 percent of this money and we're going to paint lines in Iowa when the injured body of water is Long Island Sound.

Senator **Dodd**. I hear you. I hear you. Any one else want to comment on that?

Mr. **Leahy**. We've looked at that. Obviously when you look at the funding issues regarding Long Island Sound, it is the biggest question mark. Having not heard of it before you just mentioned it now, not initially being opposed to it at any level, I think one of our senses is that the funding is going to come from three different sources—one is users of the Sound, second is people who violate the public trust by degrading the Sound by dumping illegally, and third from a more broad-based public fund of some sort. Everyone, especially in the dual State area, benefits from the Sound. The 1 percent surcharge seems to fit into this partially in a user sense and partially in a broad-base sense. So my initial reaction would be that it sounds like a good idea and we should certainly look into it further.

Mr. **Miller**. I would just like to say that it is important that we put the scenarios all in front of us and then assess them on the basis of what the different revenue sources would be and what their impact would be to other proposals. So it would be difficult for me to just endorse this one or that one until I had——

Senator **Dodd**. I want to emphasize again, this is not something that either one of us is laying out. We just wanted to share the ideas. Lastly, I would just suggest to you one idea—and I said it half facetiously to Joe, I happen to be watching the ferry leave Bridgeport here and heading over to Port Jefferson—and the idea of maybe using a facility like a floating office came to me. This has been done in the past. I spent a few days this summer with an office on a floating dry dock which services submarines at sea. It moves from place to place and it struck me that having something like that is not all that bad an idea. It is something you could move around, something where you could actually get up some of the rivers. Well, anyway, it is just an idea.

Senator **Lieberman**. I have just one question really for Terry, maybe a comment and a question. We first got involved when you were involved with the fishermen in the law suits, one of your most important characteristic is your outrage because you have lived on the Sound, you understand what is happening. What is great is that you've taken that outrage and really put it into some solid advocacy and response to the problem. I only hope that the general public interest, some of which is outrage, that the other three members of this panel have witnessed, will also be carried forward by a lot of other people besides you—maybe not as much as you do—into some of the same kind of involvement as you've had.

I remember that in some of our earlier conversations you were really concerned about health effects of what's happening in the Sound. When we talked about the marine life there, you voiced the fear that if we didn't take action we might someday see in the Sound some of the deformed species of marine life that we've seen in other bodies of water in America as a result of some of the toxics. Why don't you just give me an update on where you think we are in terms of the health effects of the problems in the Sound and the threat to marine life.

Mr. **Backer**. I think the health effects are really a key to a lot of why we need to move quickly, why we can't drag our feet. We've certainly been deferring the project since the turn of the century as far as doing something to clean up this body of water quicker. I mentioned before that stripped bass and blue fish caught from Long Island Sound come with a health advisory warning the people who catch them to limit their consumption of that. Nursing moms, pregnant women, children under the ages of 14 should not eat these fish at all. And those of us who are adult males, it appears, are to limit our consumption. That to me is not acceptable. We have 75 percent of the Connecticut coastline closed to the direct harvest of shellfish. Nearly all of New York's portion of the western part of the Sound is also closed to the direct harvest of shellfish. Why? Because there is a health risk involved with eating shellfish from those contaminated areas.

If I was not here today and the wind wasn't blowing 30 miles an hour out of the southeast, I would be right across the harbor here catching sea oysters off of Bridgeport and I would be shifting them to places where the water was clean enough to grow them for market consumption because you can't eat them from here.

We have found diseases on animals in the Sound that cause deformities and in my rush to get here this morning I forgot one of my little show and tell projects which was some lobsters that are suffering with a disease fishermen call "Burn Hole" disease, or chetinoclasia. If you look at them, it looks like someone has burned a hole through their bodies, through their shells. The lobster shell is made of chetin that is like your fingernails. There are bacteria and products in the water that attack this chetin and start to digest it. Unfortunately, the lobster's gill plates are made of the same thing, are made of chetin, and it generally eats through the carapace, through their side, and chews up the gill plates. It is like reaching in through your side and ripping out a chunk of your lung. It tends not to be very healthy for you and it is not very healthy for the lobster either. Fortunately, that doesn't represent the health risk to humans, but it is certainly a health risk to the lobster. Connections between the disease, chetinoclasia, a shell deformity disease, have been made to areas where environmental degradation is prevalent, such as Boston Harbor, Buzzard's Bay, and no one has really looked at it in the Sound yet.

When we talk about health risk—you have to remember that my family makes their money fishing and we wield a two-edge sword—we can cut the problem or we can cut our own throats. Certainly we don't want to put fish and stuff on people's tables that aren't healthy. That's why when I met you several years back we were on the attack. I don't always agree that we're just all the enemy. I believe that there are some enemies out there. I think that's one of the reasons people won't go swimming. We're all in fear of our health. It is the one thing most of us has that doesn't get taken away until we get old.

Senator **Lieberman**. Do you think it is getting better?

Mr. **Backer**. I don't know whether I think it is getting better. Really, I don't see what we've done in the last four or five years since we first met. We've raised awareness. I've covered a lot of ground and I've invested six years of my life in this—that might have been the home I don't own, it might have been my War and Peace novel, who knows—I've made a long term commitment to the water body. Your bill is a long term commitment to Long Island Sound and that's why I support it. We talked about peaks of awareness, I don't think it is getting any better. I don't see where it could get any better. We haven't spent any great deal of money, and I use the word spend and not invest, but I do think it is an investment. So I don't think things are getting any better.

Senator **Lieberman**. That's a sobering note to end this panel on but it is realistic and it is really right from the water. Again, we hope that this bill and the creation of a full-time, permanent Federal office committed only to Long Island Sound and its clean-up will take some of this concern that we've all got, put it together, get all the governments working together with private industry and municipalities and make the Sound what we all want it to be.

Mr. **Backer**. Well, Senator, you sure have my support.

Senator **Lieberman**. Thank you. Thank you all for being here this morning.

Senator **Dodd**. Thank you very much.

Senator **Lieberman**. The final panel is composed of some local officials and an expert on alternative financing. It addresses the local concerns inherent in implementing a plan of this size and begins to take a look at some of the long-term financing that may be required. We welcome Mayor Thom Serrani of Stamford. Senator John Atkin of Norwalk will update us on the efforts of the legislatures of these two States to work together. And then Mr. Ken Rubin, president of Apogee Research, which I believe is headquartered in Bethesda, Maryland, will outline some of the research begun on financing strategies in addition to his experiences doing similar work for Narragansett Bay and Puget Sound.

Senator **Dodd**. I should have saved that last question I had for this panel. I apologize. You've heard the question.

Senator **Lieberman**. Again, we thank you. We ask you to give a brief opening statement and then we'd like to enter into some dialogue. Thank you for your patience in waiting to go on.

Mayor Serrani, my hometown Mayor, my mother's Mayor, good morning.

STATEMENT OF HON. THOM SERRANI, MAYOR, CITY OF STAMFORD

Mayor SERRANI. Thank you very much Senator. We have some written testimony which I would like to submit.

I would like to just get into some of the basics. Obviously the bill will help to support a coordinated effort on Long Island Sound and so we are here to support the bill. I've been asked to highlight briefly the municipal efforts, in this case Stamford's effort, to improve the quality of water on Long Island Sound. Let me break it down into three major areas.

First of all, Stamford has a sewage treatment plant that takes in sewage from a single sanitary sewer system that runs through the City. We have a separate storm drain system that runs into Long Island Sound. Our sewer system is separate. Most of the sewer systems in the State of Connecticut are combined. We have done major infiltration, exfiltration studies in the City that enables us to determine where breaks in either pipe is causing an exfiltration of sewage into the storm drains and into Long Island Sound. That study has been going on for a number of years. It lead a few years back to a project called Operation Shellfish and for a very minimal amount of money, $50,000 a year, we have been able to make corrections to all the storm drains and sewer pipes, hundreds of corrections, in the coastal area and thereby preventing this exfiltration, infiltration into the system. That system again works on the basis of overtime. There are some small capital costs of $30,000 to $40,000 for the purchase of cameras that are slid through the pipes and they take photographs of the various conditions of the pipes. Overtime is basically the effort here in addition to the smoke testing and dye testing. We've tested thousands of homes along the shoreline to determine where there are illegal taps into the storm system from homes. That effort has enabled us to clean up Long Island Sound to the point where just a few weeks ago we were able to open up our clam beds again on Westcott Cove.

The next area is the sewage treatment plant itself. Our sewage treatment plant has a 20 million gallon capacity. We have done some retrofitting in the plant, first with plywood and then with fiberglass, a more permanent structure, to the two clarifiers that we have—roughly $35,000 per clarifier, a $70,000 one time capital cost—that has enabled us to cut down on solids and process the water through our system. That is known as the Stamford Baffle and is being used not only throughout the State of Connecticut but being used around the country, thanks to an EPA study that was done a few years back.

We also process twice our effluent water. When it finishes out through the system, it goes back through again, bacteria is reintroduced, enabling the City to take out 99 percent of ammonias, take out upwards of 75 percent of nitrates, and anywhere from 30 to 50 percent of the phosphates out of our water system that goes back into Long Island Sound.

The third area that I think is important too is the area of testing. We're testing in 17 locations on our shoreline and those tests enable us to get the accurate information as to where and when these problems are occurring so we can have a better idea of finding the source of pollution on Long Island Sound.

I'll limit myself to that and answer questions on our municipal effort. I just might point out one other thing since we're talking about two States. I don't know if it has been answered here for you this morning. We were talking about floatables and one thing that I've learned as I've gone along is on the Connecticut side we do have grates that will stop various solid materials that go down through the toilets before they get into our sewage treatment plant. We pull up the materials, scrap off the materials, and burn the materials in our incinerator. I'm not so certain that New York has those grates and therefore these materials, like the tampons and the other things that come through, are able to get into the plant and then the overflows occur causing that to get into Long Island Sound. Connecticut is more stringent on that than New York is and I think it is something that you might want to point out. These are minimal cost items. The process of going through twice in our sewage treatment plant ends up being about $10,000 more in electricity a year but yet we're able to do what we stated to you this morning. I think it has been very effective on a very small cost basis in cleaning up Long Island Sound waters on the Stamford shores.

Senator **Lieberman**. Thank you, Tommy. While your comments are in our minds, I would like to just ask you one question. What strikes me is that you've had a pretty good record, the community has supported the investment that has been necessary to improve your sewage treatment. Why? What's the strategy? What's the secret?

Senator **Dodd**. Besides your natural political skills and ability to convince everyone of the rightness of your ways?

That's part of the answer that I was expecting. That's easier coming from us than it is from Thom. He's a shy guy.

Mayor **Serrani**. We had a lot of very active and educated people in Stamford in this field. We have a top notch superintendent of liquid waste, Annette Seamen, who is well studied in these areas and who is able to come in and make her case to our various boards that appropriate the money. About $10,000 more in electricity, $70,000 in the Stamford Baffle, and the $50,000 a year in Operation Shellfish is a very minimal amount of investment to clean up our Sound, at least along our shoreline. If everyone was acting in that way, we feel it would assist us in getting to the long-term clean up of Long Island Sound. But I think it is personnel and activity of people in our community.

Senator **Lieberman**. Haven't you spent a lot of money in upgrading the sewage treatment plan too?

Mayor **Serrani**. We are going to build a third clarifier. We've got two now and we will be building our third shortly. There has been a number of dollars that have been put into the sewage treatment plant over its 15 year life. We've done a lot of work, a lot of work, on the subterranean infrastructure, the storm pipes and the sanitary pipes that run underneath our streets. In fact, in one case about five years ago we had a problem right off of the clam bed where a sewer pipe that runs from Darien into Stamford—we do take Darien's sewage into our system—was broken. That pipe in effect was being filled with Long Island Sound water at high tide. That water was now running down into the plant unnecessarily, we were processing that water and putting it back out into Long Island Sound. As the tide ran out, we were also pulling out the sewage into the shoreline. Just fixing that one pipe alone saved us about a half a million gallons a day in unnecessary processing of water. So there are some things that can be done. These are very simple things and we think that it is important that everybody recognize that there are some things that can be done now. The long-term obviously is upgrading all the plants on Long Island Sound.

Senator LIEBERMAN. John.

STATEMENT OF HON. JOHN ATKIN, CONNECTICUT STATE SENATOR, AND VICE-CHAIR, BI-STATE LONG ISLAND SOUND COMMITTEE

Senator ATKIN. Thank you for the opportunity this morning to testify before both of you. I am the State Senator from Norwalk, representing two shoreline towns of Norwalk and Darien. I serve as Vice-Chairman of the Environment Committee in the State Legislature as well as being a founder of the Bi-State Long Island Sound Caucus and now its co-Chairman with Senator Owen Johnson of Long Island. I have also been recently appointed to the newly formed Bi-State Marine Resources Committee.

A little over three years ago I formed this caucus of shoreline Senators from Connecticut and New York because I saw the need to coordinate the effort between the States of Connecticut and New York. I give you that brief background because I think that history helps explain the next logical step and that is for State government to look to the Federal government for assistance; and assistance not just in dollars and cents, but assistance in terms of coordination of the efforts of Federal, State, county, and local governments as well as—and this is critical—the dozens of environmental groups, some of which you heard this morning that are involved in the effort to restore Long Island Sound to where it should be restored.

I would like to briefly comment on some sections of the bill that jumped out at me in terms of thoughts of what direction these sections might head. In section 3(b)(1)(f), I think consideration ought to be given to a little bit more public participation in the steering committee. It indicates that the two co-chairs of a citizens advisory committee and the technical advisory committee would be part of the steering committee. I think consideration ought to be given to a few more public members on that particular steering committee.

In terms of section 4(g) where you indicate that the advisory committee, through the director, shall convene meetings with various legislators from the two States, I think that perhaps it should be a little bit more explicit in terms of when, how often so that meetings are assured. I think that the give and take between the State and the Federal levels of government would be critical in the coordination process. I believe the bill says that "he shall call meetings." But I think maybe if you said on an annual or a twice annual basis, and perhaps even with the Bi-State Marine Resources Committee, those meetings would be more assured.

Section 4(j) deals with the oil spill contingency plan. Obviously this is a necessity in light of the Alaskan and Rhode Island and other tragedies in this past six or eight months. You indicated that the director would be soliciting recommendations from various State, Federal, and local agencies. I think if it is permitted under the law, the director perhaps should be able to solicit information from local coalitions made up of owners of various oil terminals and other private terminal owners that ring the Sound. I think since they are on the firing line everyday and have a lot of the technical expertise, perhaps they should be included in the recommendation process.

In terms of the studies, getting into section 4(o), the wetlands protection issues looks to analyze recommendations for preservation and purchase by the Federal government or other entities of wetlands and wetlands restoration. I'm not sure how this concept could be incorporated into that particular section, but I think with development eating up more and more of our wetlands—whether it is through bulkheading or filling, and particularly in Connecticut we have home rule that the local communities are very protective of—but I think the whole issue of coastline development could easily in some manner be incorporated into the wetlands preservation and recapture section of that part of the Study.

In dealing with subsection (k), with shellfish and other wildlife populations, again, I'm not sure of exactly the language or the wording, but I think perhaps included in that particular subsection could be an overall look at the health of the commercial fishing industry in the State of Connecticut, whether it be shellfish or fin fish, as well as perhaps the expansion of the industry, if that's possible, as the western end of the Sound becomes healthier, hopefully over the next decade or so and the oxygen levels do increase and we find more fin and shell fish in the western end, maybe a Federal look at that industry in this State would be interesting.

The final point on the bill that I would like to discuss is the demonstration project of the Norwalk Harbor. I think that this Project is an absolutely critical cog in the entire plan and need for denitrification. The biological plan, as you know, that has been successful in Chesapeake Bay I think has to be tested in a more northern clime that we have in Long Island Sound as well as with larger plants. The plants that have been using this denitrification process in Chesapeake Bay are smaller plants. I think it is critical to see whether these plants are successful up here in Long Island Sound. I think it is a suitable project for several reasons. One, the plant is about three-quarters of a mile upstream so the effluents would be able to be easily tested before it is disseminated into the rest of the Sound. Additionally, testing has been done for nearly three years in five spots along the Harbor so you would have some valid before and after testing. Finally, the cost factor. If this biological denitrification process is feasible in this climate and in these conditions, we are talking about dollars and cents that are somewhere in the area of 15 to 20 percent that of the $6 billion figure that is being bandied about now. So we could possibly be doing for a billion or so dollars what is estimated now as costing $6 billion.

I would like to also touch briefly on the Bi-State Marine Resources Committee which was created by statute by the States of Connecticut and New York concurrently in 1988. The Connecticut delegation of the committee has met. We also did meet with the congressional delegation back earlier this spring. I've been in touch with our Department of Environmental Protection and our Governor's Office and we hope to have a meeting with New York State of the Bi-State before the end of 1989. The role of the committee, which is composed both executive and legislative branch officials, executive branch officials including the Governors of the respective States, is to make specific recommendations concerning the maintenance, protection, and restoration of the Sound. It also should look at the standardization of laws relating to the Sound and look at the adverse impact any proposed action might have on the resource. The committee is also required by law to report to the Governors and the Legislatures on an annual basis. I think again that another major role of this Bi-State Committee could be the interaction with the Steering Committee of this new Long Island Sound Program.

Finally, Joe, you ask that I discuss to some extent the funding strategies. This is obviously a complex and a very complicated issue. I think that I've already discussed how we could save perhaps $4 billion to $5 billion if this demonstration project is successful in denitrification and updating our sewage treatment plants. The State of Connecticut Legislature toyed with the idea, as well as the Department of Environmental Protection, of a submerged land-leasing program, a program that has worked in seven other States and some States raising a lot more money than others, but a program that does raise money. Senator Spellman, Chairman of the Environment Committee, and myself have been discussing the idea of a tax on toxics emitted into the air and into the water that would go directly into our State Long Island Sound Fund.

I'll close with that and be happy to answer any questions at the appropriate time.

Senator **Lieberman**. Thank you, John. Before we change the focus just a little bit I want to ask you briefly, in the Bi-State Committee are you finding that the legislators on both sides of the Sound hold the clean-up of the Sound to be a priority. In other words, is there a comparable level of interest in both legislatures?

Senator **Atkin**. The only direct experience I can give you is the informal Bi-State Caucus that I formed three years ago where we had met on a semi-regular basis, holding hearings and meetings in both the States of Connecticut and New York. I can tell you that the Senators from New York on both sides of the political isle are very committed to the need to restore the Sound to where it should be restored to. The Bi-State Committee, as a committee, has not yet formally met. But in my correspondence with the appointed members in New York, the three Senators and three Assembly people, they too are committed to this whole process.

Senator **Lieberman**. Are they people who are from Long Island or are they people from elsewhere in the State who happen to be interested in the environment?

Senator **Atkin**. They are from Long Island and Westchester County, if I'm not mistaken.

Senator **Lieberman**. Sure, which is natural.

Senator **Atkin**. Senator Owen Johnson is the Chair of one of the Long Island Sound subcommittees in the New York State Senate. I know Senator Susie Oppenheimer from Westchester County is also a member of the committee.

Senator **Lieberman**. Mr. Rubin, welcome. How do we pay for all of this?

Mr. **Rubin**. Well, I brought my checkbook with me.

STATEMENT OF KENNETH RUBIN, PRESIDENT, APOGEE RESEARCH, BETHESDA, MD

Mr. **Rubin**. Good morning. My name is Kenneth Rubin. I am president of Apogee Research, Inc. We are a public works, economics, and finance consulting firm based in Maryland. I am here today to offer my support for your bill and also to bring to the table some of the innovative things that are going on in finance in other estuaries around the country with whom I've worked for the past three or four years. I'm also here representing myself in that I'm a native New Yorker who grew up enjoying the beaches and swimming on Long Island Sound, as well as boating and fishing. At the time I was growing up, which was not that long ago, I ate the fish. So my comments have a personal tone to them as well.

I have formal written testimony that I would like to submit and I will summarize that right now. In particular, I'd like to focus on the financial planning needs to support the implementation of the Long Island Sound Management Plan. Before I go into my summary, let me give you a brief background on the kind of work we've been doing with EPA and some of the other estuaries around the country as somewhat of a backdrop.

In July of 1986, my firm, Apogee Research, initiated an ambitious three-part program with the Office of Marine and Estuarine Protection at the EPA to integrate the concepts of financial planning with the science of cleaning up the nation's estuaries and coastal resources. Prior to our getting involved, there was an awful lot of science that got done but not a lot of financial analysis in that people studied what needed to get done, by whom, and when but very little about who ought to pay for it, how should they pay for it, and schedules for implementation.

I say that we started a three-part program, we're now in the third phase of that, the first phases were general technical assistance documents, how one thinks through financial planning, a blueprint for financing, and so on and so forth. In the second step, we put on a series of seminars, workshops, and training sessions around the country with State and local resource managers, largely biologists, chemists, program managers who had never thought through the issues of financing very carefully to introduce them to the jargon and the concepts of public finance and to the fact that they would have to soon confront these issues if they wanted their programs to go forward. As I mentioned, we're in the third stage where we are now producing estuary specific financing plans to move the CCMPs, the management plans off the shelf and into action. We have completed what we believe is a very strong financial plan for the clean up of Puget Sound. We are maybe two-thirds of the way finished with the completion of a comparable plan for Narragansett Bay, and we have just begun the work on Long Island Sound.

Let me turn to the substance of my testimony. As a bit of a backdrop, we bandy around $2, $3, $4, $5, $6 billion a year in the aggregate. In 1987, all governments in the United States spent about $40 billion on environmental protection. By the year 2000, just to maintain today's level of environmental protection, we will be spending about $55 billion. If you add several new programs that are already on the books as a result of the environmental legislation of the early and mid-1980s, just at the local government level that will add about $5 to $6 billion a year in additional expenditures to bring that level of environmental quality up to the level contemplated in those bills. And as they develop new programs, like the one we're talking about here in Long Island Sound, those costs will be increased even more. What some people don't realize when they kick around some rather large numbers like that is that there is an underlying shift in who has been paying for these costs. In the early 1970s, the Federal Government was paying for something on the order of 30 percent of the cost of environmental protection. By the year 2000, the Federal share will drop to 8 percent under current policies. The local share will increase to 82 percent of all environmental programs by the year 2000. So not only are the numbers large but there is this shift going on where the Federal Government is withdrawing their support and the locals are having to pick it up. What this adds up to is I believe that our nation as a whole, and Long Island Sound is a microcosm of the nation, faces a formidable but in my view a manageable challenge if we're to pay for the level of environmental quality that we have been demanding in public opinion polls. Financial planning helps us get part of the way down the road there.

At the expense of oversimplifying a very thriving industry just south of here on Wall Street, let me summarize the four steps in financial planning that we go through when we enter an estuary. We ask the same question you just did, how are we going to pay for this thing.

The first question is an obvious one: How much will it cost? The second question is a little bit more painful: Where will the money come from to pay those bills? The third question few people really confront until a little bit late in the game: How will the money be managed? I think your bill comes close to addressing that. And, finally, the fourth one: What institution is needed to oversee the financial transactions? I should point out that the answers to these questions are not really distinct, that is, how much will it cost is very integrally linked to who will pay for it and how. We've just completed several studies looking at the effect of the shift in EPA's Construction Grants Program where the Federal Government had prior to 1985 paid 75 percent of the cost of capital improvements and has shifted to 55 percent. That resulted in a net decline of about 30 percent of the cost of sewage treatment plants. The reason for that is as local government was asked to pay a higher share, they sought more cost-effective ways to deal with the investment and the public was made aware that they would be paying more out of their pocket than they were used to paying, they brought political pressure to bear on their governments and slowly but surely the cost of capital expenditures was ratcheted down and can probably continue to do so.

Senator LIEBERMAN. That's a powerful story. Is it with the same effectiveness?

Mr. RUBIN. That's right.

Senator LIEBERMAN. So the withdrawal of Federal money and increasing pressure on the localities actually has reduced costs by about 30 percent?

Mr. RUBIN. In the case of standard secondary sewage treatment plants, yes, that's right. That's exactly right.

Senator LIEBERMAN. Is there a broader message there?

Senator DODD. Well, keep it to yourself if there is.

Mr. RUBIN. Only to say that these questions are interrelated. Let me point out what in my view has come to the surface in our dealing with about a half a dozen estuaries around the country. We've worked with the Chesapeake Bay, we've worked with Sarasota Bay, we've worked with the Gulf Initiative that is attempting to coordinate the entire range of Gulf Coast States, Puget Sound, and also the ones I've mentioned earlier. The components of a successful financial plan is in our view the one that answers the four questions I just posed in such a way that the public and other affected interests will lend their support. That requires essentially four things:

One, the assurance that the benefits from cleaning up coastal waters are well worth their costs. Often we do a very inadequate job of communicating the benefits of clean up. We do a very good job of communicating problems and a relatively good job of communicating solutions, but not the real benefits to you and I and to our community at large.

Two, the public demands that the burden of paying for clean up is distributed equitably among polluters and beneficiaries. A seemingly simple statement yet one when you go in practice to put together a balanced financial plan is often the most difficult element to achieve—that balance of who is paying and how much, and how, and out of whose pocket will the checks be written.

Three, once funds are collected that they will be managed responsibly. This day and age you can pick up the Wall Street Journal or the New York Times and find out about a wide array of mismanagement of public funds. It is on the public's mind. I read about the HUD scandal in the paper this morning.

And four, finally, both the public and private interests have to be committed institutionally to both the restoration and the continued protection of the resource in the sense of pollution prevention. I think your bill addresses that squarely.

Obviously how a financial plan measures up against these basic criteria largely determines public acceptability.

Let me very briefly tell you what our project is about in Long Island Sound. We are focusing on nutrient controls. Just like the management plan focused on a couple of priority issues, our financing plan is focused strictly on the hypoxia problem. In particular we will be focusing our attention on the options to finance the reduction in nutrient loadings, examining the capital and operating costs of such technical initiatives as upgrading waste water treatment plants, controlling fertilizer application, examining stormwater controls, the correction of combined sewer overflows, and the control of rural run-off. We hope to be working with a finance subcommittee, which has not yet been formed but which we are currently working on forming, who will help guide our technical analysis and, presumably, make a formal recommendation to the Management Committee of the Long Island Sound Study on financing.

We hope to come up with a balanced plan, as I mentioned, and by example let me very briefly tell you what is in the Puget Sound financial plan. You may find it instructive. Again, it is part of the answer to where will the money come from. In Puget Sound we were only looking for about $40 million a year. The reason for that is they don't consider the clean up of waste water treatment plants in their purview, that's handled through two other funds outside of the activities. Clearly that's the largest demand on public resources, but there are other mechanisms to finance these things. The finance committee in Puget Sound examined more than two dozen options and put together four sources of funds. First they looked at an array of State taxes and fees on motor vehicle manufacturing, the harvesting of food fish and shell fish, and small tax on aquaculture, a fast growing industry in the Pacific northwest, tax on marine fuel sales, and a small surcharge on the leasing of State lands. In the aggregate, that's going to raise about $9 million a year. We looked at local water quality utility revenues, the formation of water quality management districts at the local level who, through various assessments and so forth, taxes and fees, would raise between $17 and $20 million a year, largely to handle stormwater control, nutrient controls, and other local kinds of technical initiatives. We recommended that a Puget Sound regional fee be paid by all households in order to spread the burden as equitably and as broadly as possible and to reduce the burden at the household level. By example, a fee of $12.50 per year per household would raise $15 million which would go into long-term research program designed to attack the unfinished agenda that you are anticipating in Long Island.

Senator Lieberman. That would have been on any homeowner?

Mr. Rubin. Levied at the household level.

Senator Lieberman. Would that include renters?

Mr. Rubin. It would be levied on all dwelling units.

Senator Dodd. Within the State?

Mr. Rubin. Within the Puget Sound basin. Interestingly enough in the State of Washington there is a political rift just about where the mountains are, either water falls to the east or to the west, and if you live to the west, then you are in the basin of Puget Sound, if you live to the east, you are not. Generally, the revenue raising mechanisms tend to fall the way the water does. So this would be restricted to just within the basin, but it goes all the way up to the watershed boundaries, to the mountains.

Senator Lieberman. How was that received?

Mr. Rubin. It is just now being received. We just submitted it last week.

Senator Dodd. You're obviously not running for office out there.

Mr. Rubin. I am not. I am staying on the east coast.

Senator LIEBERMAN. Didn't one part of the plan get defeated in the Legislature or am I wrong?

Mr. RUBIN. The extension of the Puget Sound Water Quality Authority as the instrumentality to implement the plan was a little iffy at one point.

Senator LIEBERMAN. But otherwise it has gone forward?

Mr. RUBIN. Yes, it has. The final component out there is very much along the lines of your proposal, the formation of a Puget Sound Foundation which would raise between $2 and $3 million a year from private donations, bequests, grants, awards, fines, penalties, the sale of a Puget Sound decal, and income from a Puget Sound Affinity Card, a small rake off the top of a new credit card which holders would pay a certain amount extra for.

The list of so-called interesting and new and innovative supplemental ideas doesn't really end there. Let me just rattle off a few that we've come across and tried to implement in other locations which may have relevance in the Long Island Sound area and some of which you've already touched on today. A 2 percent real estate transfer tax today raises about $6 million a year to purchase critical shoreline for conservation and access in Nantucket. A 3 percent occupancy tax on lodging in Dare County, North Carolina—that's the Outer Banks area—raises a little over $1 million a year for water and sewer improvements, upgrades to the wastewater treatment plant. There are all manner of tax increment financing schemes around the country; one in Orlando, Florida, raises about $2 million a year for the improvement of wastewater treatment plants and a similar program has just been proposed to fund the protection of critical areas adjacent to Chesapeake Bay. That's one that I think has particular applicability for Long Island Sound. Over $1 million a year is raised in sport fishing licenses in Maryland's Chesapeake Bay. And there are a number of interesting finance options that involve capacity credit, or selling future capacity in as yet unbuilt wastewater treatment plants around the country, which work very well in areas facing very high development pressure. It distributes the burden nicely across existing and new populations and raises money up front without impairing the credit quality of the underlying jurisdiction. Not that any single one of these alternatives will necessarily be appropriate for the Sound and probably none will be sufficient in and of itself, but if these and other measures were taken in the many jurisdictions comprising the Sound, I believe that we could put together a financial package which will address the priority problems.

Let me just conclude by restating the five essential components that in my view move a financial plan off the shelf and into action. The first is a firm understanding of the sources of degradation and the remedial activities needed to restore and continually protect the environment. The Long Island Sound Study is well on its way to becoming that critical component. The second, as I mentioned, is a clear communication of the benefits of clean up to the public, to local governments, to regional industry, to State Legislatures, and obviously to the U.S. Congress. Number three is putting together financial plans that fully disclose the cost of different levels of restoration and that balance revenue collection with the willingness of public and private interest to pay for clean up. Number four is responsible management of funds with direct accountability for environmental results, not necessarily direct accountability for the dollars spent but what happened with those dollars, link them to environmental results. Finally, the commitment of both public and private interests to long-term institutional leadership to oversee the implementation of clean up plans. To me this suggests that your provision in the bill to form a Federal office for Long Island Sound is one alternative that demonstrates that commitment at the Federal level.

Thanks very much and I look forward to questions.

Senator LIEBERMAN. Thank you and thank you for your support of the idea of the Long Island Sound office. I believe in some of the work that you've done at one point you estimated that a $1 of prevention spent on water quality can save $10 of clean up. Just borrowing from the suggestion that Chris made earlier, I know in the case of Superfund clean ups, they estimate that $1 in prevention saves up to $100 in clean up. Just talk to us a little bit more about that so we can have a mood of optimism as we go forward.

Mr. RUBIN. I guess an ounce of prevention is always worth a pound of cure and it is no different in the environmental field. I think your statistics may even be modest on the Superfund area. Those are three or four years old by now and I think some of the more recent clean ups, particularly if you turn to the clean ups at the nuclear waste facilities, $1 worth of prevention probably could save far more than $100 of clean up.

Scaling down the total expenditure and so forth on the water quality side, $1 worth of remedial measures put into best management practices say for rural run-off control can save an awful lot of money in terms of sediment restoration, sea grass restoration, habitat creation and fisheries maintenance, and so forth. There is fairly clear linkage between the kinds of upstream activities that are relatively inexpensive to the more downstream or near coastal clean up measures, which are at least $10 for every $1 spent upstream.

Senator LIEBERMAN. Is your work for the Long Island Sound Study going to also include recommendations about new structures that may be necessary. For instance, there has been some talk about a new authority composed at least of New York and Connecticut, maybe also of some other levels of government, to focus on the clean up of Long Island Sound.

Mr. RUBIN. We will be working pretty closely with the Policy Committee of the Long Island Sound Study as well as the Management Committee indirectly. We will be taking largely the recommendations for technical initiatives as they give them to us and if that's one of the things that comes on the table, then yes, we'll consider that.

Senator LIEBERMAN. So if they ask you to answer the question, you'll answer it. Otherwise, it is not inherently part of what you're doing at this point?

Mr. RUBIN. We are not directly looking at institutions. We're mostly looking at the first three questions I asked.

Senator DODD. Thank you. First of all let me commend John, you, and Thom for what you are doing at the local and the State level and at the regional level. I think it is terrific. Thom, you're proving that you can do these things and do them in a cost-efficient way and build strong support for them.

John, let me ask you sort of a technical question. I should have probably asked this of the first panel. All but three of the waste treatment facilities in Long Island Sound are secondary treatment facilities. I guess the one in Port Chester, in Mamaroneck, and there is one other one that is not. How many of these should be tertiary in your view? Which ones are really doing a good job in your view?

Senator ATKIN. That's probably the $6 billion question. I think that the ideal in the next decade or two would be to have all 44 be tertiary. I think the management study will ultimately determine—and again, Chet Arnold or others may be a little bit more quick to answer the question—but I think ultimately the management study will show the first five or ten are prioritized and show where the initial updating to tertiary should go. I was at a hearing in New York City to discuss the New York City sewage treatment plants, which are responsible for nearly a third of all the effluents that find their way into the Sound, and I dare say, as somebody not involved in the Study and not a professional water engineer, that perhaps some of New York City plants will be the first to be looked at for recommendation to get to tertiary.

Senator DODD. You commented on that Chesapeake program as well, Thom.

Mayor SERRANI. I think you have to break it down even further. You have your primary, secondary, and tertiary treatment plants, but I think you have to break it down between what we consider most of the plants as being secondary minus, where we consider ours as being secondary plus. That's a whole gap between secondary minus and secondary plus because, indeed, what we're doing in Stamford is close to tertiary. So if we can just get the plans up to secondary plus, improved from their existing status, we will be ahead of the game.

Senator DODD. I want to commend you as well, Ken, especially for your comments on restoration and continuation. I think too often there is this focusing on the restoration and then not letting the public know—we see this in a variety of different areas in our infrastructure generally—the cost of maintenance, the cost of maintaining a consistent program that does not allow deterioration. I think the history of these environmental areas demonstrate that once they do deteriorate it takes forever to get them back in shape. So I commend you for that suggestion.

Lastly, Joe, I commend you for holding the hearing up here. I'm delighted to be a part of it. I think this is very important and we hope contributes in some way to the public awareness of the importance of these issues. By doing these kinds of things in the area, I think we raise the level of conscientiousness, which has already been demonstrated how high it is. I think it is fascinating that survey done by ConnPIRG and the number of people who raised the issue of Long Island Sound, people who live miles away from it who feel so strongly about restoring it. So I'm delighted to be a part of the bill and to be here with you this morning.

Again, I thank all three of you for your comments and testimony, as well as the other panelists.

Senator LIEBERMAN. Thank you very much, Chris. Thanks for spending the time here and for cosponsoring the bill. I appreciate your kind words at the beginning about my involvement in environmental protection areas since I've been elected. You are the senior Senator and——

Senator DODD. Don't ever forget that, Joe.

Senator LIEBERMAN. Though I am the older Senator. Don't ever forget that.

Senator DODD. That's true, too, Joe.

Senator LIEBERMAN. Your cosponsorship with me will make the future of the bill much brighter. Obviously we're both happy to be joined by Senators Moynihan and D'Amato from New York and that will help us along the way.

I have found this to be a very encouraging and educational morning. I appreciate the fact that so many of you came out and stayed here to hear the testimony. I very much appreciate the testimony and the support that was given for this idea. I leave here committed, as we all are, to cleaning up this treasure that we have out that window and feeling that the idea of a Long Island Sound office is really a logical next step in making sure that there is a permanent interest and that we really do followup. As Terry said, it can be the office that has ultimate accountability in the sense that it is responsible for making sure that everybody is working together and that everybody is working. If that happens, then our kids and their kids are going to have a much higher probability of being able to swim and fish and enjoy Long Island Sound.

There is a copy of the most recent Long Island Sound Study annual report available out there if anybody wants to pick it up. I encourage you to do so. It is a very important document.

Second, for the record, I want to state that our record will remain open for 30 days.

Thank you all very much. The hearing is adjourned.

[Whereupon, at 12:45 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Statements submitted for the record and the bill S. 1722 follow:]

DAVID FIERRA
DIRECTOR, WATER MANAGEMENT DIVISION, REGION I
U.S. ENVIRONMENTAL PROTECTION AGENCY
APPEARING ON BEHALF OF EPA REGIONS I AND II
BEFORE THE
SUBCOMMITTEE ON ENVIRONMENTAL POLLUTION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Bridgeport, Connecticut
October 2, 1989

Good morning, I am David Fierra, Director of the Water Management Division of the United States Environmental Protection Agency, Region I. I am pleased to be here today to discuss the Long Island Sound Study (LISS).

The Long Island Sound Study began in 1985 when the Congress appropriated funds for EPA to assess and improve the environmental health of the nation's most important estuaries. Four estuaries were named this first year, including Long Island Sound. In the 1987 Clean Water Act amendments, the Congress formally established the National Estuary Program, and added more estuaries to it. After the 1987 amendments, the Long Island Sound was officially designated as an estuary of national significance and a management conference was convened to develop a comprehensive plan for its clean-up and preservation. This required a formal schedule of program commitments from the participating states and EPA.

The National Estuary Program is based on the lessons gained from the Chesapeake Bay and Great Lakes programs. Its goal is to develop recommendations to protect and restore estuaries in a cost- effective manner. The program represents a holistic, geographical approach to environmental protection. For example, the program recognizes that to protect our estuaries from degradation, we may need to go beyond technology-based controls and adopt more stringent water quality-based limits for point sources, additional nonpoint source controls, and comprehensive planning which addresses future land-based impacts on the Sound.

We have identified the five most significant problems affecting Long Island Sound: hypoxia, toxics, pathogens, floatable debris and the management of the Sound's fisheries. To understand these problems and establish their causes, EPA Regions I and II and the States of New York and Connecticut have worked together to establish a collaborative problem-solving process along with other management conference participants. Together, we have reviewed historical data to determine information gaps and where gaps existed, we have conducted research necessary to understand the system. The Sound Study is now in the beginning of the fifth year of a six year research and planning process. The research phase of the study is nearly complete. We are currently formulating specific strategies to address the problems and developing comprehensive plans for implementing them. Rather than talk generally about each area of the Study, I will focus my remarks today on our findings and actions on the most pressing problems of the Sound, hypoxia and toxics.

Hypoxia, or low dissolved oxygen, can occur naturally in estuaries, but Long Island Sound Study research suggests that hypoxic conditions have been intensified by excess nutrients -- particularly nitrogen -- entering the Sound largely from sewage treatment plants, runoff, and the atmosphere. The excess nutrients stimulate phytoplankton growth, resulting in intense algal blooms. As the nutrients are used up, the algae die and are decomposed by bacteria. Decomposition of the algae uses up tremendous amounts of oxygen, sometimes making the waters unsuitable for fish and shellfish.

In the summer of 1987, a severe hypoxic event in the Sound helped establish hypoxia as the principal focus of the Long Island Sound Study. Sampling of Long Island Sound bottom waters from Throgs Neck Bridge to Port Jefferson revealed critically low levels of dissolved oxygen -- levels as low as zero. Fish trawls conducted by the study documented the effect of this hypoxic event on marine organisms in the Sound. Fish avoided areas with particularly low oxygen concentrations and some that did not escape were killed. Few invertebrates were caught in the trawls, and 38% of those caught were dead. Lobstermen reported finding dead lobsters in their pots. Dissolved oxygen concentrations in 1986 and 1988, although better than 1987, were also below acceptable levels in the western Sound and well below state standards.

An analysis of dissolved oxygen measurements taken during the Study and historical dissolved oxygen data collected in the 1950's and 1970's convinced members of the LISS Management Conference and outside experts that determining hypoxia's cause and effect would require development of water quality and circulation models. To help us understand what is causing hypoxia and which solutions would be effective, we assembled a team of the best scientists and engineers available to construct computerized water quality and hydrodynamic models of Long Island Sound. The models mathematically represent the physical, chemical, and biological processes that take place in the Sound.

These models allow us to evaluate how different sources of nutrients contribute to hypoxia and test how effective various strategies for controlling those sources would be to improve water quality. Data collection to feed into the models began in 1987 and is just now being completed.

We know the relative magnitude and sources of nutrient inputs to the Sound. For example, the average annual waterborne load of nitrogen to the Sound is 50,000 tons:

- 38% comes from sewage treatment plants,
- 49% comes from nine Connecticut tributaries, and
- the remaining 13% comes from urban runoff and other sources.

Knowing the sources, how can we develop the most cost-effective nutrient control program to alleviate the hypoxia problem, and avoid a recurrence of the hypoxic event of 1987? To accomplish this goal we have begun to:

- develop a set of management alternatives to reduce nutrient inputs to the Sound,
- define the cost of each alternative, and
- use the models to predict the efficacy of each alternative in reducing the risk of hypoxic conditions occurring in the Sound.

Our first step is to establish the level of dissolved oxygen that we need to achieve in the Sound and the reductions in nitrogen inputs required to achieve that level. Workgroups composed of federal, state, and local experts will determine what additional point and nonpoint source control programs we will need to achieve these levels. Because the discharge of nutrients is not effectively controlled by existing technology-based programs, we will need to implement additional control measures.

For example, virtually all Long Island Sound sewage treatment plants have upgraded to secondary treatment; however, this level of treatment is not designed to remove nutrients. We therefore may need to go to advanced treatment at some plants to remove nitrogen and possible phosphorus. Hence, additional control programs might include:

- removing nutrients at sewage treatment plants,
- controlling runoff by implementing Best Management Practices on farms and in urban areas, and
- reducing fertilizer usage on farms and homes in the Long Island Sound drainage basin.

To help us understand the effectiveness and applicability of treatment options, the Study has embarked on two nutrient control demonstration projects supported by special funds from EPA's Office of Marine and Estuarine Protection.

Traditional chemical methods of removing nutrients at sewage treatment plants are very costly, but other emerging biological methods may be less expensive. In order to demonstrate the effectiveness and potential cost savings of these biological nutrient removal technologies, we are funding pilot projects at two existing Long Island Sound treatment facilities. The objective is remove nutrients from the waste stream using biological treatment, so that each of the pilot plants will discharge measurably less nitrogen and phosphorus to the Sound. These steps should help improve local water quality. More importantly, the results of these pilot projects can be applied to other sewage treatment plants that discharge into the Sound. Nutrient removal at the two participating plants will begin in March 1990.

Concurrently, we are demonstrating ways to control nutrient runoff by co-funding with the Connecticut Council for Soil and Water Conservation, the Soil Conservation Service, and others, a pilot project involving 27 farms in the Housatonic River watershed. The purpose of this project is to reduce the amount of nitrogen farmers put on their fields. At no cost to the farmers we will test their soil to determine the precise amount of nitrogen needed. We expect that at many farms, they may not need to purchase any chemical fertilizer and will be able to use available manure instead. By reducing the amount of nitrogen added to the fields each year, this project will reduce agricultural nonpoint source nutrient loads to the Housatonic River, which flows into the western end of the Sound. If the nitrogen test proves effective, then other farms may adopt it as well. Sampling and testing of the remaining 20 farms will begin in March 1990.

Some of the control measures will be expensive and all will impact state and local governments. It is therefore important to select the most effective and efficient strategies. The models we are developing will enable funds to be targetted at reducing sources that will have the greatest effect. In addition, we are supporting a study to develop a financial plan for equitably allocating and financing the costs of implementation between various sources of pollution. And finally, because of the importance of the hypoxia issue, EPA, the States and others will be formulating a preliminary plan addressing the control of hypoxia by September 30, 1990. Implementation of selected measures will commence by October 1, 1990. The preliminary plan will be based on the results of a preliminary water quality model, and will recommend actions commensurate with the level of confidence that we have in that model. A refined plan for controlling hypoxia, due November 30, 1991, will be developed based on the added confidence obtained by coupling the water quality model with detailed information on circulation from a hydrodynamic model.

In summary, the goal for States and other local entities to take preliminary actions by October 1, 1990, where our understanding of the problem and how to address it is sufficient.

This will include actions to address hypoxia. The plan for management of Long Island Sound will include recommendations to address all the significant issues facing Long Island Sound by November 30, 1991. In developing this plan, the total financial burden on the regulated community resulting from the Long Island Sound Study and the other regional estuary management studies, such as the New York New Jersey harbor study and New York Bight Restoration Plan will be assessed. We firmly believe that implemention of these plans in a coordinated manner by States and other local entitles will provide the best long-term protection of our coastal waters.

Another of Long Island's pressing environmental problems is contamination from toxic chemicals. Chemicals in the water and sediments can be harmful to marine animals and to humans who eat seafood from the Sound. While some Long Island Sound Study research suggests that conditions are improving, there is ample evidence to show that the Sound has a toxics problem caused by historical and ongoing discharges of contaminants.

At the outset, the Long Island Sound Study compiled existing information on the contamination of water, sediments and fish in the Sound. To better understand the distribution and effect of toxics, we also supported research on the levels of toxics in fish and shellfish and the effect of contaminants on reproduction and development. We found contamination generally higher in the western half of the Sound. While contaminant levels in seafood were generally below the Food and Drug Administration's action levels for banning interstate transportation, the levels of some contaminants were higher than expected. Concentrations of cadmium and PCB's were particularly high in lobster tomalley.

The Sound Study also funded a toxics control demonstration project in Black Rock Harbor, Bridgeport, Connecticut, to reduce the threat that toxic contaminants pose to marine resources, including valuable oyster beds located offshore at the mouth of the Harbor and in nearby areas. This project seeks to reduce the input of toxic contaminants to the Harbor by better control of point sources of toxic materials. Specific sources identified as toxic will be regulated by Connecticut's NPDES program. The Sound Study will use these results as a model for measuring contamination effects of coastal embayments and implementing control measures throughout the Sound. The final toxics management plan recommendations, along with plans for addressing the other significant problems facing the Sound, will be made by November 1991.

Thank you for the opportunity to tell you about the Long Island Sound Study. I would be happy to answer any questions you might have at this time.

TESTIMONY OF LESLIE CAROTHERS, COMMISSIONER

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

BEFORE THE U.S. SENATE SUBCOMMITTEE ON ENVIRONMENTAL PROTECTION

CONCERNING LONG ISLAND SOUND

BRIDGEPORT, CONNECTICUT

OCTOBER 2, 1989

* * *

Good morning, distinguished Senators. My name is Leslie Carothers and I am Commissioner of Connecticut's Department of Environmental Protection. I would like to thank you for offering Connecticut the opportunity to present testimony on the critical issue of Long Island Sound water quality and to comment on the proposed "Long Island Sound Improvement Act of 1989". Connecticut applauds the intent of the bill to ensure continuation of the excellent work the states of Connecticut and New York have begun in cooperation with the U.S. EPA. While we are pleased with the progress of the study, the future holds a major challenge for state and federal agencies to ensure implementation of the Long Island Sound Study (LISS) recommendations. With federal support and a central focus for Long Island Sound issues the implementation and future of the Sound will be greatly enhanced.

ESTUARY OF NATIONAL SIGNIFICANCE

Through the National Estuary Program, Long Island Sound has been designated an estuary of National Significance. As indicated in the bill, Long Island Sound is a significant body of water and unique from most other estuarine systems in its configuration, dynamics and level of development. It is a large estuary, about 113 miles long, covering 1300 square miles and 17 trillion gallons in volume. The Sound is a valuable resource providing commercial and recreational opportunities to the residents of Connecticut, New York and the Northeast. Fifteen million people, about 7% of the US population, live in the drainage basin of Long Island Sound, about 5 million within fifteen miles of the Sound. There are 200,000 boats registered Sound-wide and an estimated three quarters of a million people sport fish in the Sound. Sportfishing provides between $70 and 130 million to the regional economy. Connecticut's three largest beaches receive more than 2.5 million visitors each year. Commercial aspects include a $40 million dollar (market value) commercial fishery Sound wide and 20 million tons of freight pass through Connecticut's major ports each year, much of it fuel and petroleum products.

LONG ISLAND SOUND OFFICE

The political boundaries of Long Island Sound present unique management problems: two states and two regions of EPA as well as many other federal and interstate agencies play key roles in managing the Sound. The continuation of the Long Island Sound Study Management Conference via the Long Island Sound Office Steering Committee draws upon a successful arrangement that has fostered excellent rapport among the agencies, citizens and researchers. However, I strongly recommend that the Long Island Sound Study Policy Committee which includes the environment commissioners of Connecticut and New York and the Regional Administrators for Regions I and II of the U.S. EPA be kept active as an oversight group of the Steering Committee. The Policy Committee should continue to set policy and direction for Long Island Sound management activities and provide the link between administrative agencies and elected officials.

The attempt to provide a New York/Connecticut balance by relocating the office in alternate states each five years is appreciated. However, logistical difficulties are likely to arise. We suggest that the wording be changed to site the office in a location mutually agreeable to Connecticut and New York. This will prevent disruption of staff and facilities and foster long term continuity of the office.

Quite correctly, this bill sees implementation and the "unfinished agenda" of the Comprehensive Conservation and Management Plan (CCMP) as concerns which will need attention and action when National Estuary Program funds dry up. In particular, the purpose of the office is to "oversee, assist and support" Long Island Sound activities rather than to build another regulatory layer, providing the states with help rather than additional regulatory burden that may duplicate existing authorities. This type of assistance and coordination bodes well for successful implementation of the CCMP.

The bill provides for review and enhancement of existing programs, related to and apart from the Long Island Sound Study. Areas designated for special study include oil spill contingency planning, review of enforcement and compliance issues, growth and development, public access, sediment contamination and dredging, nonpoint pollution, wetlands protection, atmospheric deposition and biological resource evaluations. These special studies should improve interagency communication and approaches to resolving water quality problems in Long Island Sound. These programs will be fortified by new initiatives proposed in the bill: grants for research, monitoring, education, enforcement, planning and implementation, all necessary if we are to succeed in improving the way we manage Long Island Sound.

DREDGING

Section 119 (c)(3)(F) recommends an examination of dredging activities in Long Island Sound, which is useful exercise. There is presently no clear evidence that disposal sites represent a significant water quality problem in Long Island Sound. Therefore, I recommend the mandatory requirement to prepare proposals to clean up dredge dumping sites be modified to assure continued effective management of the sites which may require cleanup or remediation activities as appropriate.

HYPOXIA AND NUTRIENT MANAGEMENT

Hypoxia has proven to be the biggest issue and has commanded most of the attention and funding for the Long Island Sound Study. To evaluate and understand this problem, water quality and hydrodynamic models are being constructed that will identify what's causing hypoxia and which management alternatives will be effective in correcting hypoxia. We still have questions to resolve on East River dynamics, the role of nitrogen vs. phosphorus and the loads of nutrients derived from non-point sources including atmospheric deposition.

While the bill focuses on "nitrogen" evaluation and management, the modelers and researchers involved in the Long Island Sound Study have not closed the door on the role of phosphorus and its potential for management. I suggest that the intent of the bill be shifted to include study and review of "nutrients", including both nitrogen and phosphorus with emphasis on nitrogen, at this point. The emphasis on nitrogen removal projects at municipal treatment plants should continue, however, since it is the technology that is likely to be most costly and the one with which we have the least experience with in this area. The states are looking at a huge price tag to resolve the one issue of hypoxia; research and planning funds are needed to ensure that the problem is resolved in the most cost-effective manner possible.

NORWALK DEMONSTRATION PROJECT/NITROGEN REMOVAL

Connecticut and the City of Norwalk are planning a project to implement nitrogen removal at the Norwalk sewage treatment plant. Water quality studies performed by DEP from 1986-1988 have shown high levels of nutrients (both nitrogen and phosphorus) and low levels of dissolved oxygen in Norwalk Harbor. The algal productivity of the Harbor appears to be enhanced by the excess loading of nutrients to the system, leading to low oxygen during periods of respiration. A major source of nutrients to the harbor is the treatment plant which is not currently designed to remove nutrients. The data also suggest that nitrogen is the limiting nutrient in the harbor and that conditions will improve upon removal of nitrogenous compounds from the sewage treatment plant wastestream. Benefits of nitrogen management include enhanced recreational and commercial opportunities in the harbor as well as testing a nitrogen removal technology that can be applied to other coastal facilities. This is a likely recommendation that will come out of the Long Island Sound Study to improve offshore hypoxic conditions.

The demonstration project will construct three individual pilot plants to investigate the technical feasibility of biological nitrogen removal. These pilot plants will establish design criteria for Norwalk and other treatment plants along the coastline. The details of the demonstration project have been finalized and Connecticut is making arrangements with Norwalk to provide funding. The consulting engineer will begin working on the technical aspects in the very near future. Support for demonstration projects involving nitrogen removal is important, and I thank you for your support of the Norwalk Harbor project in the federal Senate subcommittee deliberations on appropriations.

Additionally, the LISS Point Source Working Group, co-chaired by Connecticut, is investigating temporary modifications at existing plants to remove nitrogen. The purpose of this effort is to explore the feasibility of at least partially removing nitrogen with existing facilities. This will evaluate potential [illegible] 1) interim measures to begin implementation and 2) achieving some cost savings. Two facilities, one in Connecticut and one in New York, are expected to participate in this effort.

TOXIC CONTAMINATION/BLACK ROCK HARBOR PROJECT

The issue of toxic contamination has not been as intensively addressed as hypoxia by LISS. Efforts have been focused on reviewing the status and trends of toxic contamination in the Sound using available data supplemented with some reconnaissance studies of fish and shellfish tissue contaminant levels. Estimates of contaminant loadings reveal a trend toward association with major wastewater streams being discharged to the Sound. Prior to state and federal clean water initiatives, much of the load may have been from untreated industrial discharges, all of which are now under strict permit limits which have substantially reduced industrial metals loads. In 1971, Connecticut initiated statewide pretreatment program and has since inventoried all discharges of any significance to municipal sewerage systems and issued permits requiring levels of treatment comparable to river dischargers. While little monitoring in Long Island Sound exists to document trends in toxic contamination trends, a comparison of oyster tissues from Connecticut's most industrialized harbor areas collected in 1985-86 compared to tissues collected in the mid 1970's suggest tissue burden reductions of up to 90% for some metals. The states continue to aggressively pursue toxic contaminant reductions through water quality based permitting strategies, now fully implemented in Connecticut.

This does not mean that our work to resolve toxic contamination issues in Connecticut is completed. Our participation in a special study of Black Rock Harbor with the EPA's lab in Narragansett, RI, is attempting to resolve toxicity dynamics in a complex environment. The researchers are looking at the traditional point sources as well as non point contributions from combined sewers, landfill leachate and the contaminated sediments in the harbor. The sources and sediments are being chemically analyzed and used for toxicity bioassays with marine organisms to determine combined effects of multiple sources on the overall toxicity of the receiving water. If successful, this will provide a tool for assessing other harbors and relating ambient toxicity to specific source types in a complex system. Management of sediments may be one of the recommendations that come out of the study. The special study proposed in the bill to remove contaminants from estuarine sediments may be a step toward resolving a very difficult problem which needs to be corrected--the legacy that past, uncontrolled discharges have left in marine sediments in many coastal embayments.

OTHER MANAGEMENT ISSUES

There are many areas of study and management that the Long Island Sound Study and past initiatives of state and federal agencies have undertaken to improve conditions in the Sound. In recent years, control of toxic substances and pollutants which lead to dissolved oxygen problems have received most of the attention. Even in these areas, emphasis has been on control of point sources with the challenge of non point sources, particularly atmospheric deposition, left largely unanswered. When we look at Long Island Sound, we see the future issues are not in the arena of conventional water quality management. Many are largely a result of "people" problems. Others include the way wildlife and fisheries habitats are managed. We must ensure that correction of Long Island Sound problems includes proper development and land use perspectives and that the high demand for Long Island Sound resources for recreation and commerce do not negate the value of water quality improvements gained from initiatives like the Long Island Sound Study. Marina construction and public access will continue to be key public concerns in the future as the press for a "piece of the Sound" continues. Non point issues, particularly the role of atmospheric deposition and the legacy of contaminated sediments will take time to understand and manage. Finally, the living resources present a complex and challenging aspect of management that will involve both water quality and habitat improvements.

CONNECTICUT INITIATIVES

Indeed, Long Island Sound is a national treasure which we are firmly committed to preserving for future generations. As such, we are expanding State programs to provide research, monitoring and management of this precious resource. A few of the recent State initiatives include:

- Establishment of a $22 million Long Island Sound fund to provide grants for combined sewer overflow and nutrient removal facilities along the coast under the CT Clean Water Fund financing program.
- Establishment of a $2 million fund for harbor and wetlands improvement projects and a $1 million fund for research into coastal waters.
- Development of a nutrient removal pilot project at the Norwalk sewage treatment plant.
- Conducting a cooperative research project on marine toxicity at Black Rock Harbor with EPA's Narragansett research lab.
- Establishment of a Connecticut/New York Bi-State Commission and a Connecticut Long Island Sound Assembly to enhance the citizen's and legislative role in involvement in Long Island Sound.

FUTURE NEEDS

Passage of the "Long Island Sound Improvement Act of 1989" will provide the vehicle to begin addressing the complex needs that Connecticut and New York will face in implementing the recommendations of the Comprehensive Conservation and Management Plan. Connecticut will face myriad management and research needs including the "unfinished agenda". Only with continued cooperation of New York State and the federal agencies can we hope to address the comprehensive problems of Long Island Sound. Examples of some of these complex needs are:

1) Continue research initiatives identified by the Long Island Sound Study and create a structure to address future research needs. Through the leadership in the Connecticut Senate, we have taken the first step towards meeting long term research needs by providing one million dollars in research funds for 1989.

2) Complete waste load allocations for municipal sewage treatment plants contributing to offshore hypoxia, assign loads to individual municipalities and modify NPDES permits as necessary to meet water quality goals.

3) Enhance existing funding programs to facilitate the construction of facilities at municipal sewage treatment plants to remove nutrients in accordance with recommendations of the Long Island Sound Study. New cost estimates to remove nitrogen and correct combined sewer overflows anticipate a final cost of $1.4 billion for Connecticut.

4) Assess drainage basins for contributions of nutrients and toxics to Long Island Sound and develop control plans that may be necessary to improve water quality. This would include evaluating nonpoint source loads from urbanization of the shoreline and implementing best management practices.

5) Inventory and assess coastal marine habitat critical to the well-being of valuable recreational and commercial fisheries and implement management controls to ensure habitat protection.

6) Design and implement a comprehensive, bi-state monitoring program that will identify conditions and assess progress of management programs in the Sound.

7) Continue existing programs to control toxic pollutants and amend programs as necessary to manage additional problems as they are identified.

8) Design and implement a broad-based education program to generate the public support necessary for the long-term management of Long Island Sound.

9) Evaluate the extent of sediment contamination and develop management plans to correct existing problems.

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In addition, the public participation and education aspects included in the bill should receive continued emphasis. The population and development problems we are faced with today cannot be managed until the general public understands the problems and contributes to their solution. This includes the way we manage our individual properties and the way the authority held by the individual towns is used to ensure land use practices are compatible with good environmental quality. It is critical to the long term success of the program that we have immediate, visible progress in managing problems in Long Island Sound. As an example, correcting litter and debris problems along the shore has captured the attention of the public. Steady progress in managing this issue will be highly visible and taken by the public as a sign of success. Also, expanding public access, a commodity in extremely short supply around Long Island Sound, will greatly enhance public perception of the program and generate support for more costly, long-term measures that loom in the future.

These are but a few of the issues before Connecticut and New York in the management of Long Island Sound. The issues, problems and solutions extend beyond our boundaries and require federal assistance in research, monitoring and modeling to find the answers -- answers necessary to the sound management of our coastal and ocean resources.

Thank you for your attention and the opportunity to comment on the proposed Long Island Sound legislation on behalf of Connecticut.

Testimony of

Roberta E. Weisbrod, Ph.D.

Special Assistant to the Commissioner

New York State Department of

Environmental Conservation

before the

Senate Subcommittee on

Environmental Protection

October 2, 1989

Bridgeport, Connecticut

Good Morning, Senator. I am Dr. Roberta Weisbrod, Special Assistant to New York State Commissioner of Environmental Conservation Thomas C. Jorling. I appreciate this opportunity to represent Commissioner Jorling at this hearing to examine water quality issues of the Long Island Sound and to comment on the proposed Long Island Sound Improvement Act of 1989 which we understand will soon be introduced by yourself and Senators Moynihan and Dodd.

This legislation is a comprehensive and ambitious plan to provide for continued emphasis on Long Island Sound issues after completion of the Long Island Sound Study. The strength of the bill lies in its provision for focused and sustained federal involvement, including funding, in Long Island Sound issues through creation of a Long Island Sound Office. The Office would focus on overseeing implementation and fine tuning the recommendation of the Management Plan and on conducting studies of issues not addressed in that Plan. The Office would operate within the current EPA structure but consist of representatives of Both EPA regional offices which now have jurisdiction over the Sound. So long as this new structure has the necessary policy-making authority, we believe it could serve as an impetus for post-study federal involvement which might not otherwise occur in an agency with other competing demands and limited resources. Thus, we see creation of this office as potentially furthering and building upon the many positive results of the Long Island Sound Study.

Central to the successful operation of the office, however, will be continuation of the structure of the Long Island Sound Policy Committee. Under that structure, the states, which have the major burden for program implementation, are co-equal partners with the federal government, sharing in decisions of program direction and content. The legislation does not now provide for continuation of that organizational structure. We understand that it will be revised to do so, and on that basis it would be supported by New York State.

We have other suggestions for shaping the mission of the new office. Issues of public access and recreational opportunities are traditionally state issues; when the federal government does get involved, it is through the Department of Interior and not EPA. We suggest that the resources and efforts of the new office not be diluted by assigning to it those functions for which EPA has traditionally not been responsible and which are more appropriately handled by the states.

The Long Island Sound office is directed to conduct a study of the feasibility of establishing a regional authority to accomplish nutrient removal. We support the intent of the provision but note that sub-committees of the Management Conference are already working with an outside consultant to develop a financial plan for nutrient removal.

Among the options being examined are special taxes, user fees and other funding alternatives. We suggest that the Office use this work as a blueprint to devise an implementation strategy. It is not advisable to limit the office's mission to examining the possibility of a regional authority if it is to make the most productive use of the work already on-going under the auspices of the Long Island Sound Study.

The provisions of the bill requiring relocation of the Office every five years are well-intentioned but will be disruptive to the functioning of the Office. We suggest picking a permanent site agreeable to both states and to the EPA.

We have other suggestions concerning the mission of the office and for clarifying the intent of the legislation which we will communicate to your staff. The only other comment on the bill we wish to offer today concerns funding for the proposed Office. The $3 million authorization is welcome and certainly necessary to accomplish the intent of the legislation. However, the long term success of the post-Long Island Sound Study Program will depend in large measure on the willingness of Congress to sustain funding at levels necessary to support the activities outlined in the bill.

Turning to the questions posed in the hearing notice, the State of New York is strongly committed to meeting the resource needs of the Sound. We began to address many of the problems illuminated by the Long Island Sound Study even before they were so uncovered.

New York State first voiced concern over the impact of nitrogen discharges to marine waters in the early 1970's. Nitrogen limits were proposed and incorporated in some permits for discharges to embayments on Long Island. Hard evidence, however, in the form of water quality data and cause-and-effect relationships was not available at that time to defend the proposed effluent limits.

In addition, New York State included, in its submission to the USEPA for the initial (1973) and subsequent Survey of Needs for Municipal Wastewater Treatment Facilities, the costs of nitrogen removal for New York City and other New York State municipal discharges to the marine coastal waters. The costs were determined to be ineligible for federal funding on the basis that data was not available to support the contention that nitrogen loadings had a deleterious effect on water quality. (In 1974, the estimated cost was $2.4 billion; in 1989 equivalent dollars, the cost is $5.7 billion.)

Pending completion of management plans with implementation recommendations for the Federal National Estuary Program studies of Long Island Sound and New York-New Jersey Harbor, New York would consider requiring municipal facilities which are in or entering the planning process to investigate the feasibility of nitrogen removal processes. New York also supports the review of existing municipal facility operations to maximize the removal of nitrogen.

New York State has only a very small, but intensely developed, portion of the drainage area of Long Island Sound. Point source rather than non-point source contributions of nitrogen are of primary concern in this area. As a result, over the past two years, New York has been monitoring or requiring monitoring of point source nitrogen loadings from Long Island Sound sewage treatment plants to establish a baseline for future reductions, and to provide data for the water quality model being developed by the Long Island Sound Study. Present concerns for nitrogen stimulated water quality problems in Long Island Sound have been incorporated into research programs for the New York-New Jersey Harbor Estuary Study.

Regarding the Mamaroneck Action Plan, its purpose is to address the longstanding problem of rain-induced beach closures; an ancillary purpose is to limit the amount of sediment entering the harbor. The causes have been identified. Their relative contribution to water pollution and potential solutions are being addressed in a pilot study involving two subregional areas, each several blocks in size, one of which will be used as a control site. Non-structural best management practices (probably street cleaning, catch basin cleaning, and emphasis on compliance with pet waste ordinances) will be implemented.

Implementation of the Best Management Practices will proceed on a voluntary, cooperative basis at the local level through the Mamaroneck Harbor Action plan. The Department has already taken other steps to reduce storm related discharges to Mamaroneck Harbor. For example, grants have been awarded for infiltration/inflow studies in the Mamaroneck Sewer District collection area. Via consent order, the Mamaroneck Sewer District has been required to correct excessive infiltration/inflow (roof leaders, sump pump discharges, etc.) to the collection system. Finally, completion of the new treatment plant outfall line to Long Island Sound will essentially eliminate emergency stormwater overflow to Mamaroneck Harbor.

Findings of the Mamaroneck Action Plan could be used to develop technical permit conditions to control stormwater runoff to correct water quality impairments. Federal regulations for a stormwater permit program have not as yet been promulgated.

New York has been a national leader in reducing toxic contamination of our waterways. Among our principal initiatives to reduce toxic pollutant effects are:

1. Establishment of standards (concentrations of each substance which should not be exceeded in the receiving water of the point discharge) for 95 toxic pollutants. These standards are incorporated into discharge permits.
2. Requirements for industrial pre-treatment programs for municipal sewage treatment plants which discharge in excess of five million gallons a day. Eleven New York facilities affecting Long Island Sound are in the process of implementing pre-treatment programs approved by NYSDEC and the EPA.
3. Remediation of inactive hazardous waste sites to reduce toxics discharge to the Sound. The goal of this program is to remediate all sites in the State by the year 2000.

4. Limits on the use of pesticides which contribute to degradation of water quality in the Sound. New York was one of the first States to ban DDT in the 1970's and to limit TBT usage in the 1980's.
5. Development of a Non Point Source Management Plan which will leed to further limitation the introduction of toxics and nutrients to the Sound. The draft plan is presently under interested public review and will shortly be submitted for general public review.

New York also implements effective fishery management and habitat protection programs. New York has experienced virtually no loss of wetlands in the vicinity of the Sound since enactment of our Tidal Wetlands Law in 1972. We have also purchased wetlands in Udalls Cove, Baiting Hollow, Mattituck Creek, Mt. Sinai Harbor, Conscience Bay and Stony Brook Harbor. This year, the State Legislature enacted tough provisions in the new Tidal Wetlands Act proposed by Governor Cuomo which also provide new resources for implementing and enforcing the regulatory program. The Act implements many of the recommendations of the Tidal Wetlands Advisory Committee, a Committee composed of environmentalists, scientists, legal experts and developers appointed by the NYSDEC to make recommendations for improving the tidal wetlands program.

We recognize that more will need to be done to improve the Long Island Sound. The Comprehensive Conservation and Management Plan for the Sound will fully document these needs. New York State participates in activities associated with the plan at many levels to ensure the plan's success. We have 18 staff members actively working on this project, and we brief our sister State agencies biannually on the estuary program and solicit their comments on Study findings and recommendations.

Because we share jurisdiction with Connecticut for the Long Island Sound, we are also striving to maintain close communication and cooperation with that state and the EPA, both through our collaboration on the Long Island Sound Study and through the work of the newly created Bi-State Long Island Sound Marine Resources Committee. We will sustain this level of involvement through completion of the study and, hopefully, through the post-study activities provided in your legislation.

Thank you again for this opportunity to be heard on these very important issues.

STATEMENT OF:
TERRANCE E. BACKER
LONG ISLAND SOUNDKEEPER

CONCERNING

LONG ISLAND SOUND IMPROVEMENT ACT OF 1989

October 2, 1989

My name is Terrance Backer, I reside at 53 1/2 Glenwood Avenue Norwalk, Connecticut. I am a third generation fisherman working the waters of Long Island Sound. I am a founding member of the Connecticut Coastal Fishermen's Association and I serve as the Long Island Soundkeeper for the Long Island Soundkeeper Fund, Inc. The Long Island Soundkeeper Fund is an organization dedicated to the protection and enhancement of the Sound's biological integrity.

The Long Island Soundkeeper Fund actively monitors the environmental conditions of the Sound in a number of ways, among them are, routine patrols of the estuary's waters in order to seek out sources of pollution and habitat degradation. The Long Island Soundkeeper Fund conducts a Harbor Watch program which gathers scientific data on targeted harbors and embayments in Long Island Sound. The date collected is shared with researchers at the University of Connecticut, as well as, the Connecticut Department of Environmental Protection. The Long Island Soundkeeper Fund works with the many governmental agencies whose charge it is to protect the waters of the Sound , as well as, the marine and wildlife the Sound's waters sustain.

Statement of,
Terrance E. Backer
10/2/89

As the Executive Director / Soundkeeper for the Long Island Soundkeeper Fund, Inc. it is my job to oversee the many activities in which the Soundkeeper Fund participates.

As a multi generational fisherman and Soundkeeper I have developed, what I believe to be a unique in sight to the natural amenities the Sound provides to the nearly 15 million who make their homes in it's drainage basin, as well as, the biological problems and management frustration the Sound faces.

I could not adequately comment on the proposal, " The Long Island Sound Improvement Act of 1989 " without first citing some of the environmental condition I have personally witnessed. I have seen fish kills of massive proportions in the harbors and embayment of the Sound. Millions of dead and dying fish floating belly up upon the waters of the Sound. These fish, victims of Hypoxic condition, had suffocated due to the lack of dissolved oxygen in the water column. I have witnesses this many many times in the rivers and harbors in both New York and Connecticut. I have seen plankton blooms that have turned the waters of the Sound chocolate brown. Although plankton blooms can occur naturally in the marine environment, the condition I have experienced are not natural.

They are due to excessive nutrient loadings from the over 350 billion gallons of sewage effluent discharged annually into the Sound. The sewage discharges, coupled with non - point sources of pollutants contained in the run off, from the water shed areas, as well as, atmospherically deposited nitrogenous compounds, trigger hypoxic events during the hot summer months of staggering dimensions. In the summer of 1987 nearly 50 % of the Sounds waters were unable to adequately sustain marine life. I have seen large sewage slicks floating upon the Sounds waters, at times they may run for miles and contain grotesque rafts of human waste bobbing in the water, as well as, floatables of every description including ladies tampon applicators, condoms, syringes ...ect. Much of Long Island Sound most productive shellfish beds are closed to market harvest due to sewage and non - point pollution sources. In fact, nearly 75 percent of Connecticut's coast line and almost all of New York's portion of the Western Sound are closed for direct human consumption. many if not all of the marine species of Long Island Sound have been in decline for years. Health advisories warn citizens not to eat toxic ladened species in both New York and Connecticut, among them are the highly sought Striped Bass and Blue Fish.

Crustaceans such as the lobster suffer from what fisherman call " Burn Hole " or more properly Chitonclasia, a disease which destroys the shells of crustaceans, which can result in death. Skeletal abnormalities and tumors have been found in and recorded in flounders. The legacy of toxic dischargers lie in the sediments of the Sound bottom and dredge spoil sites sit in the center of the Sound like toxic time bombs. Finally, beach closings have become the norm in many areas of the Sound rather than the exception.

The current environmental condition of the Sound points to the need for better management. The Sound's mangers and protectors exist in a myriad of agencies at all governmental levels. The fact that the Sound is shared by two states, is divided by two regions of the U.S. Environmental Protection Agency (EPA) has left large voids and over - lapping authority, there is not a clear hand at the wheel, no one agency or department to oversee enforcement issues and the restoration process for Long Island Sound. As Soundkeeper, one who works and duals with the existing agencies on a routine basis I know the need that exist for a Long Island Sound Regional office of the EPA. A Long Island Sound regional office will be essential in the coordination and implementation of the Long Island Sound Study.

Statement of,
Terrance E. Backer
10/2/89

I know the need for a long tern commitment to the Sound on the part of government if we are to turn around the decline of the Sound.

I have read the proposed bill and find it well thought out. The bill covers all most all the issues the Sound faces and addresses them well. I particular like the fact that the local administrator will report directly to the Administrator of the EPA. I would however encourage one addition to the bill. The United States Department of Justice currently employs a policy that requires a certain percentage out of court settlements, in suits brought by citizens groups under the Clean Water Act, to be surrender to the Justice Department. I believe that these attachments by the Justice Department, should be required by this bill, to be awarded to the Long Island Sound Fund established in section 5 of the Long Island Sound Improvement Act of 1989. I believe these funds would help in improve the condition of the Sound. Further, it is clear that the Long Island Sound Fund is where such monies should go - after all it is the Sound that has been injured not the Justice Department.

Statement of,
Terrance E. Backer
10/2/89

I know a regional office of the EPA for Long Island Sound, will help speed and coordinated the restoration of the Sound. I encourage all to support the Long Island Sound Improvement Act of 1989 in doings you will have help restore the bountiful habitat the Sound once was - and can be again.

Respectfully submitted

Terrance E. Backer
Soundkeeper

TESTIMONY

of

Chester L. Arnold, Jr.
Connecticut Sea Grant MarineAdvisory Program

before the

U.S. Senate Subcommittee on Environmental Protection
October 2, 1989
Bridgeport, Connecticut

I thank the Subcommittee, and particularly Senator Lieberman, for asking me to appear at this hearing and submit my testimony.

I work for the Connecticut Sea Grant College Program of the University of Connecticut, which is, as are all Sea Grant Programs throughout the nation, dedicated to the wise use of our marine resources. More specifically, I am a member of Connecticut Sea Grant's Marine Advisory Program, which exists to help put marine science to work through technology transfer and informal education programs.

In August, the Sea Grant programs of Connecticut and New York began the third year of a joint effort to organize the public education and participation activities of the Long Island Sound Study (LISS). This effort is staffed by myself and two Public Participation Coordinators, Kathy Rhodes in Connecticut and Melissa Beristain in New York, who work out of their respective Sea Grant offices. My testimony today is from the multiple perspective of both a participant in the LISS, and a member of Sea Grant Marine Advisory.

Comments on the Long Island Sound Improvement Act of 1989

I believe that a Long Island Sound (LIS) Office would be a major step toward ensuring that the efforts of the Long Island Sound Study are brought to fruition. It must be understood by citizens, media, and elected officials alike that while the eagerly awaited LISS management plan (CCMP) is the final result of the Study, it is in many ways only the jumping-off point for a long and difficult battle to protect and enhance the Sound.

The creation of a LIS Office would recognize this important fact.

I applaud the bill for its intent to address important LIS issues that likely will not be extensively addressed in the CCMP. While issues such as wetland preservation, public access, dredge spoil disposal, and oil spill contingencies were not among the priority issues chosen by the Study, they are nonetheless crucial to the overall management of the Sound. Public education and coastal land use, in particular, are long term issues that I am especially gratified to see addressed in the bill. The various granting provisions in the bill are also an excellent idea (please see my specific suggestion for public outreach grants below).

My only critical comment is that I am somewhat confused about the relationship between the LISS (which is extended by the bill) and the new LIS Office, as well as about the actual number of individuals that would staff the Office. The bill presents the Director with an ambitious and wide-ranging slate of responsibilities. To aid the Director in accomplishing these tasks, consideration might be given to adding Office Directors for Granting Programs, Research Programs, and Public Outreach, which together with the Office Director for Enforcement Evaluation would implement the four major areas outlined in the bill.

Status of LISS Public Outreach

The LISS public outreach effort has become recognized within the National Estuary Program as being a successful and innovative program. Public awareness of the problems of Long Island Sound are currently at an all-time high, and the LISS public outreach program can claim its fair share of credit for this fact. Through a two year track record of successful programs and publications, LISS public outreach is now considered a reliable, accurate, and responsive clearinghouse for information on the Sound.

Information on the Study and the Sound has been disseminated to hundreds of thousands of people through a wide range of activities, including: 8 LISS fact sheets (62,000 copies in print); an LISS poster; LISS public service announcements on both radio and television; a bi-monthly newsletter with a mailing list of over 5000 interested citizens, and; a "network" mailing list of over 2500 organizations, elected officials, media, and other key contacts. We also work with the press and with elected officials on many occasions - on October 20th we will, for the third time, hold a Long Island Sound update for state and local elected officials, co-sponsored with the LIS Congressional Caucus.

Public participation has been accomplished mainly through the Citizens Advisory Committee (CAC), which was reconstituted during 1988 and now has 37 members representing a cross-section of LIS organizations and user groups from around the Sound. The CAC has often been effective in their principal task of advising the managers of the LISS. For example, the CAC was responsible for pointing out the need for an expanded public education effort, the importance of working with elected officials at all levels of government, and the need for a study of financial mechanisms for implementation of the LISS management plan.

While our current effort is both intensive and successful, it falls short of the enormous task of educating all 15 million people in the LIS watershed. It does, however, effectively serve as a catalyst and resource for a wide range of other private and public efforts focusing on the Sound. Copies of the 1987 and 1988 LISS public outreach Annual Report, detailing the accomplishments of LISS public education and participation, have been submitted to Senator Lieberman's staff and are availiable at any time from the Sea Grant offices.

Needs for the Future

Although we've come a long way, much needs to be done. The LISS public outreach program, by its very nature, is limited both in time and scope. Our time frame is that of the Study, and we have focused our limited resources primarily on voting citizens and on the priority problems facing the Sound. To be successful in influencing the fate of LIS, a committment must be made to a long term, multi-faceted public outreach effort that outstrips the limitations of our current program.

There are a number of areas which need to be addressed, any or all of which could fall within the purview of the Long Island Sound Office proposed in the bill. Here are four priorities which I feel should be considered for the future:

(1) Basic environmental and marine science in our school systems. To achieve long term environmental goals requires the development of a sense of stewardship, which can best be nurtured in the schools. There are already many interested and dedicated teachers in the LIS area, but they need help in the form of information, guidance and materials.

(2) The people living in both urban and upland areas must be targeted for LIS educational efforts. These people, who constitute the vast majority of the populace in the LIS watershed (and who are admittedly more difficult to reach), must learn of the importance of a healthy Sound to their lives and interests.

(3) Emphasis must be placed on the education of municipal elected officials and volunteer commissioners. Although general public education and school education may be able to create the political will necessary to pass laws, the implementation of those laws will in large part depend on action at the local level. Particularly in Connecticut, where "home rule" is strong, local land use decisions made by planning and zoning commissions have the potential to make or break large multi-million dollar state and federal initiatives. A program of regular training for incoming municipal elected officials, planners, and commissioners needs to be set up, providing them with the latest information on LIS and the role that their town plays in its fate.

(4) In addition to spurring implementation, public involvement can BE implementation. In the state of Washington, the Puget Sound Water Quality Authority has created the Public Information and Education, or PIE, Fund, which funds public outreach projects on a competitive basis to civic groups, municipalities, user associations, and others. To date, the PIE Fund has dispensed $1 million to 47 projects, involving 92,000 people directly, and 1.4 million others indirectly, in projects addressing water quality in Puget Sound and its tributaries.

Many of these projects, whether they be a YMCA toxic waste collection, workshops for farmers on fertilizer application, or water quality monitoring by a Boy Scout troop, are not only educational but entail bona fide implementation. This type of program attracts people "where they live" - at the local level, and within the context of their particular constituent group - and has a huge ripple effect in the extent of outreach (providing more "bang for the buck"). It is especially suitable for addressing the difficult task of controlling nonpoint source pollution, which must be controlled at the level of the individual farmer and homeowner. At this level, enforcement gives way to voluntary compliance by each individual as the principal mechanism of controlling pollution.

The Role and Potential of Public Outreach

You may notice that all of my suggestions involve education. Although education makes up only a part of the public involvement equation, it is the cornerstone of every public outreach effort. Constructive and valuable citizen involvement, whether it be input at public hearings, environmental activism, or support of legislation, can only come from an educated public.

Education provides a fertile ground for the growth of grass roots citizen action campaigns, and, just as importantly, can provide a much-needed positive outlook to environmental debates that invariably become couched in negatives. Education is also needed to temper and direct the bursts of public concern that occur after highly-publicized pollution episodes. Short-lived public reaction cannot substitute for a sustained educational campaign. Fears about syringes on the beach may briefly fuel public awareness, but without a basic level of understanding of the phenomena involved, this awareness will not be channeled into useful action (and may even be counterproductive).

One needs only look at the Chesapeake Bay example to affirm that public outreach can engender the political will to make difficult long-term choices needed to protect our coastal waters. Growing awareness of the pervasiveness of nonpoint source pollution makes public outreach even more crucial. With environmental concerns on the rise nationwide, and a growing concern about Long Island Sound in the region, the time is right to incorporate a sustained and comprehensive public outreach campaign into future plans to clean up the Sound.

ConnPIRG

Testimony of James P. Leahy
Executive Director, Connecticut Public Interest Research Group
Committee on Environment and Public Works
Subcommittee on Environmental Protection
Monday, October 2, 1989

Hello. My name is James Leahy and I'm the Executive Director of the Connecticut Public Interest Research Group. ConnPIRG is a statewide, environmental and consumer advocacy organization with over 35,000 members throughout Connecticut.

Mr. Chairman, distinguished members of the subcommittee, Senator Dodd, Congressman Morrison, I am honored to be here today to comment on the proposed Long Island Sound Improvement Act of 1989. We've all heard time and time again that Long Island Sound is one of our most treasured natural resources. It is encouraging to see this proposal at a time when significant federal assistance, in the form of Clean Water Fund grants, has been decreasing rapidly.

ConnPIRG strongly supports the proposal outlined in the Long Island Sound Improvement Act of 1989. It allows the framework for necessary cooperation through the extension of the management conference. As importantly, it would demonstrate to the

residents of Connecticut and New York the federal government's long term commitment towards solving the problems of Long Island Sound. It is a certainty that the Long Island Sound Study will provide us with valuable recommendations for action. It is also a certainty that if we do not follow through on those recommendations we will have broken the public trust.

Through Sec. 2(l), CITIZEN INVOLVEMENT AND EDUCATION, ENFORCEMENT, AND RESEARCH AND PLANNING GRANTS, this bill would facilitate many of the necessary activities for successful implementation of the recommendations of the Long Island Sound Study. The financial burden on many parties who otherwise could provide valuable services is tremendous. These grants could help where otherwise it would be infeasible. I would also like to record ConnPIRG's support for Sec. 2(n), Source Reduction Grants. Toxic contaminants are a problem not just in Long Island Sound, but throughout our society and the only true solution to this problem is to provide incentives for the reduction of the use of toxic chemicals.

The call for the completion of the "unfinished agenda" is also of tremendous importance. Despite the fact that the Long Island Sound Study has been the most comprehensive examination of the Sound ever undertaken, there has been neither the resources, nor the time committed to effectively address all of its problems. Let's embark on a mission of vision with regard to our solutions to these problems. Too often we attempt to address the most serious problems only to uncover more and more underneath.

While the mechanism is in place we must maximize its potential and our investment and investigate the multiple impacts on Long Island Sound

ConnPIRG is in a unique position to comment on general public perceptions of the problems of Long Island Sound. Throughout the year, we run door-to-door canvasses in every corner of the state. These are primarily for the purpose of public education, enrolling members in our organization, and involving citizens in the political process through letter writing and other direct actions. This also enables us to have direct grassroots contact with tens of thousands of citizens, not just environmentalists, and to get their sense on these issues.

During the summer of 1988, ConnPIRG campaigned for a strong Clean Air Act, a call which is still heard today. While people responded well to the issue, the numbers who then asked what we were doing on the Sound was phenomenal. It was partly as a result of this that we've made clean water and Long Island Sound an organizational priority. In May of this year, we began to focus our canvass on the problems of the Sound. The results were revealing. The visceral reaction of people at the door was intense; More than in any other place I've run a canvass. Long Island Sound is not just a coastal resource. It impacts people throughout the state.

Some people's perceptions are stronger than others. Those who live along the Sound are more aware of the complexities of the issue. Many others in the state remember only the medical waste scares of 1988. Most seem confused that, unlike with virtually every other environmental issue, there is no tangible "enemy." We are, oftentimes in this battle, our own enemy, through nonpoint source pollution and sewage overflows.

The overwhelming reaction is frustration at the inability of anyone to implement a plan of action. They perceive Long Island Sound as a topic of political debate, but seldom the focus of action. I feel very confident in saying that the people want to see a true commitment towards solving these problems.

A surprising finding was that most people are not aware of the Long Island Sound study. While decision makers and active citizens appreciate its importance, many others, if they know it at all, simply view it as another study, "more empty rhetoric". The Sea Grant program has done a tremendous job of getting the word out to the public, but the resources are simply not available to reach as many people as we need to.

Fortunately, this frustration has not led to disempowerment. The success of our canvass this summer, which brings parts of the solution to citizen's doors, demonstrates the willingness of people to act. The public education done by the DEP and citizen's groups such as ours, the Soundkeeper, Connecticut Fund for the Environment, the Coastal Coalition, and the New England Coastal Campaign, as well as the hundreds of other local groups,

will help, but we still have a long way to go. Grants for citizen involvement and education will help tremendously in this effort.

There are many distinct roles for citizen's groups in the campaign to save Long Island Sound. ConnPIRG is currently working on a report which will document the compliance or lack of compliance of Connecticut's industries with their Clean Water Act Permits. New York PIRG has published several reports on POTW's and their impact on the Sound. The Connecticut Fund for the Environment has filed citizen suits to bring NPDES and state permit holders into compliance. Many groups have published pamphlets and newsletters to help citizens do their part. The recent formation of the Connecticut Coastal Coalition has enabled many of the groups working on these types of projects to coordinate their efforts. This is a major step in the proper direction.

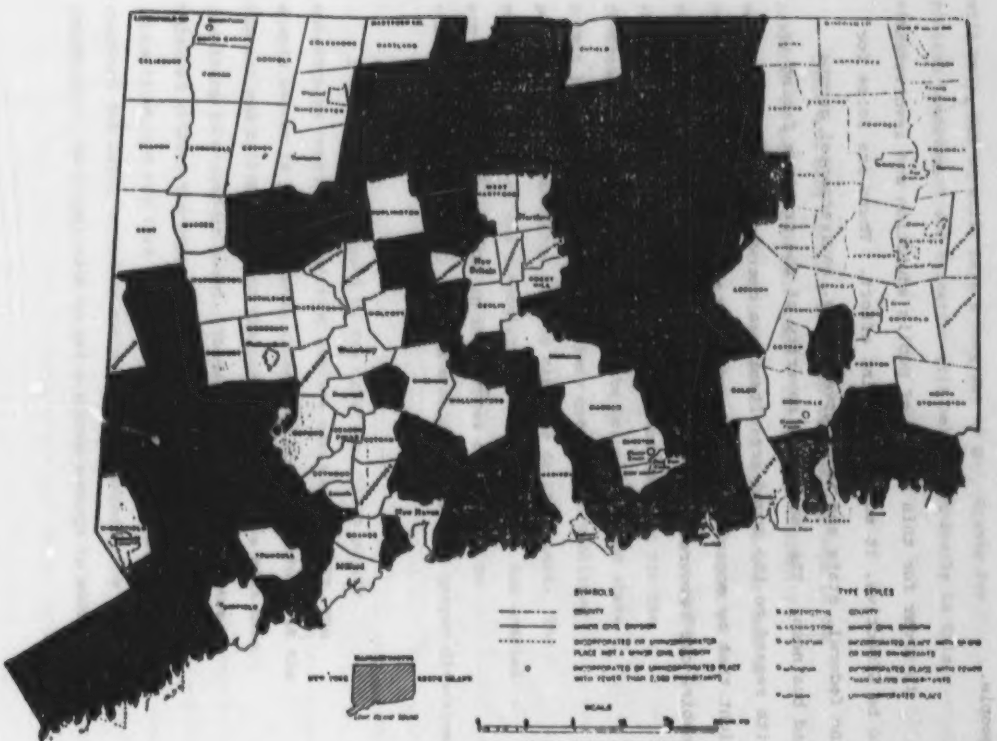
I was asked to respond to the question, "Does public outreach as currently practiced achieve cleaner waters?" The simple answer is yes. Between grassroots lobbying efforts at the Capitol and citizen suits in the courts changes have been made resulting in a cleaner Sound. These changes would not have happened without the support of the thousands of residents of Connecticut and New York who demanded them. In addition, public outreach has begun to inform citizens of the impact they can have personally. We simply need to get a strong message to more

people.

In order for this effort of public education and involvement to be effective, it must be a joint effort. There are roles for the federal, state and local governments, environmental groups and business. The scope and severity of the problems facing us with regard to the Sound are oftentimes overwhelming. We must fight that by engaging citizens as often as possible. We must combine our resources and work in concert, not in opposition.

ConnPIRG
Towns Canvassed
May - September 1989

Shaded areas have been
canvassed



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Testimony

of

David J. Miller

Northeast Regional Vice President

National Audubon Society

before the

United States Senate

Subcommittee on Environmental Protection

October 2, 1989

University of Bridgeport

Bridgeport, Connecticut

Connecticut, Massachusetts, Maine, New Hampshire, New York, Rhode Island, Vermont
AMERICANS COMMITTED TO CONSERVATION

Good morning Mr. Chairman and members of the Committee. My name is David Miller, Regional Vice President for the National Audubon Society. Thank you for providing this important forum today and the opportunity for the National Audubon Society to express its views on the needs of Long Island Sound. The National Audubon Society has 580,000 members and 550 chapters nation-wide with close to 30,000 members and 20 chapters in the Long Island Sound watershed. The restoration of the Long Island Sound ecosystem is a priority of our members in the Northeast and foremost in the minds of the entire Society.

Long Island Sound is in trouble and needs our collective help. As speakers before have identified, the issues are far-reaching and complex, warranting a comprehensive and coordinated approach to its clean up and future protection. Today's testimony will further outline those issues, possible solutions and Audubon's campaign to restore the ecosystem of Long Island Sound. The National Audubon Society has formed an Audubon Long Island Sound Committee consisting of delegates from our 20 chapters along the shores and within the watershed of Long Island Sound along with National staff from our regional, science and Washington divisions. The Committee has developed a Long Island Sound restoration platform and is working on plans to implement our 1990 Listen to the Sound Citizen Hearing Project, both outlined in this testimony. National Audubon and its chapters are also extensively involved in the Environmental Protection Agency's (EPA) Long Island Sound Study and Comprehensive Management Plan through the established Citizen Advisory Committee. While we are hopeful that this process will provide an extensive blueprint for the Sound, the true litmus test will be the "political will and action" by our federal, state and local officials to implement the plan. Major budgetary, programmatic, regulatory and coordination commitments will be needed throughout the 1990's to address the following problems.

Conventional pollutants are pouring into our Sound from lack of adequate sewage treatment, overloaded sewer systems due to the huge population growth over the past 15 years, and the problems associated with our combined sewer overflow system. A major rainstorm in the western end of Long Island Sound can cause summer beach closings the next day due to these pollution control shortfalls. Pollution from sewage treatment plants are also major contributors to a phenomenon called hypoxia or low dissolved oxygen. Simply, the high input of nutrient pollution into the Sound robs the waters of needed oxygen for fish and marine species to survive.

The pollution impacts the Sound waters most during the hot summer months, when the dissolved oxygen levels are lowest and related discoloration occurs, like the red-brown water color events of 1988. When dissolved oxygen goes below 3 parts per million, marine organisms have a shortage of oxygen and can become ill or die. While the fish kills periodically in our inlets are dramatic examples of this tragedy, more subtle impacts are occurring to our marine resources which we never see.

Overdevelopment along our shores poses a threat to the future of Long Island Sound. While new laws and regulations have halted major wetland development projects that had devastating impacts during the '50s, '60s and early '70s, today numerous small projects are adding up to a cumulative impact of concern. Our marine estuary and wetland resources are one of the most biologically productive ecosystems on earth, yet we continue to creep in on their boundaries with a fill permit here or a new housing project there. While waterfront views are lucrative to investors, marine wetlands are our natural resource investment which will enable Long Island Sound to revitalise itself once we stop our pollution onslaught. Without adequate marine wetland areas, the biological foundation of Long Island Sound will be shattered. It was reported at the last EPA Citizen Advisory Committee that close to 90 percent of the Sound's historic wetland resources have been lost.

Another pollution source which relates to overdevelopment, conventional pollution and toxic pollution is urban and rural non-point or run-off pollution. In addition to adding to the nutrient loading, whether from fertilising our lawns in suburbia or farmland practices along major tributaries such as the Connecticut River, non-point pollution also carries toxic pollutants such as heavy metals and organic chemicals as the water travels over our highways, streets, parking lots and construction areas en route to the Sound. Toxic chemicals, whether organic or heavy metals, have also entered Long Island Sound from past industrial activities in commercial harbors and major tributaries. These toxic pollutants have settled to harbor bottoms from industrial discharges, run-off from land-based activities and even the atmosphere. Through atmospheric fallout, as demonstrated in the Great Lakes, pollutants can enter the Sound's ecosystem through rainfall and dry deposition. Atmospheric fallout of toxic pollution must be thoroughly investigated and addressed to ensure our management strategies tackle all pollution sources of concern.

The subtle nature of our toxic pollution problem in Long Island Sound is that the pollutants already concentrated in harbor sediments will remain for decades and can contaminate marine animals by traveling up the food chain. When a larger animal eats a smaller one, the toxics are passed on and can increase exponentially in concentration. Certain marine species and portions of marine animals should not be eaten by pregnant women or small children due to the potential presence of toxic pollutants. While we must develop consistent public health advisory information between Connecticut and the state of New York, it is equally important to widely publicize these findings to prevent misinformation on this subject. Our challenge will be to cut off any remaining sources of this insidious pollution while finding ways to prevent the toxic pollutants already in the Sound from further spreading throughout the marine food chain.

In summary, Long Island Sound is faced with inadequate sewage treatment capacity, combined sewer overflow problems, urban and rural non-point pollution, overdevelopment of our coastal resources and toxic pollution inputs from a variety of sources. Even the atmosphere is a potential significant source of pollution to the Sound. Our harbor bottoms are not immune and can host a variety of toxic chemicals as they re-suspend into Long Island Sound's system and marine food chain.

National Audubon's Long Island Sound Committee, linking and coordinating our resources throughout the Sound, stems from the belief that this magnificent resource knows no political boundaries and all our actions must be viewed in a holistic manner. Long Island Sound needs an ecosystem approach if it is going to be saved for generations to come. To further this theme, on May 13, 1989, National Audubon's Long Island Sound Committee passed an 18-point clean up platform for the restoration of Long Island Sound. The overriding goal of Audubon's platform is "the preservation and restoration of the natural ecosystems in the Long Island Sound watershed including its habitat, wildlife, flora and fauna resources." Auduboners emphasize the need for water quality enhancement, coastal resource protection, increased governmental funding, laws and enforcement to protect our Sound.

Audubon's Long Island Sound Committee view this platform as a dynamic document with opportunities for expansion and modification as new information is made available. It will serve as a tool to mobilize citizens throughout the ecosystem to help institute and implement policies to restore Long Island Sound. The following is our entire platform for the record:

Long Island Sound Platform

The Audubon Long Island Sound Committee advocates the following policies for governments and other entities involved in the management of Long Island Sound:

Water Quality Enhancement

1. Maintain and upgrade sewage treatment plants which affect Long Island Sound water quality.
2. Implement increased monitoring and enforcement of permit requirements for industries that discharge into sewage treatment systems, and of permit requirements for industries, sewage treatment plants, and other facilities that discharge directly into Long Island Sound or its watershed.
3. Implement increased state and local efforts to reduce "non-point" pollution and sedimentation from sources such as run-off and leachate.
4. Increase identification, monitoring, and appropriate management programs for sediment areas in the watershed contaminated with toxic pollutants.
5. Implement a monitoring program on the impact of acid rain and airborne toxic pollution on Long Island Sound and advocate the enactment of federal and state control programs.
6. Call for a determination of pollution loading into Long Island Sound from Block Island Sound, Buzzards Bay, New York Bight and the Hudson River and advocate implementation of necessary controls.
7. Advocate the creation of pump-out stations at marinas to reduce pollution loading from recreational boats.

Coastal Resource Protection

8. Mandate careful and comprehensive planning for environmentally responsible use and wise management of the coastal area.

9. Preserve and enhance existing tidal wetlands, intertidal flats, barrier beaches, coastal uplands and other sensitive coastal resources in the Long Island Sound watershed.
10. Restore the impaired natural habitat in the coastal area.
11. Restrict the practice of compensatory mitigation to those situations in which the loss of the resource is unavoidable. Avoiding adverse impacts should be the primary method of mitigation.
12. Push for up-to-date mapping of all tidal and freshwater wetlands in the Long Island Sound watershed through the activities of the U.S. Fish & Wildlife Service and coordination with state agencies responsible for wetland mapping.
13. Minimize the adverse impact or damage resulting from dredging in the coastal area for maintenance of existing channels and facilities.

Governmental Support, Laws and Regulations

14. Strictly enforce local, state and federal environmental and coastal laws.
15. Audubon's Long Island Sound Committee supports the establishment of a major funding plan by the federal, state and local governments. These funds should be earmarked to achieve the objectives outlined in our policy statement for the Long Island Sound watershed.
16. Push for new laws to achieve consistency in environmental protection programs throughout the watershed, including environmental impact statements.
17. Demand increased staff and coordination at state and federal environmental health agencies, including the Environmental Protection Agency, the New York State Department of Environmental Conservation, the New York State Department of Health, the Connecticut Department of Environmental Protection and the Connecticut Department of Health Services to properly implement and enforce the laws, regulations and policies that affect Long Island Sound's natural resources.
18. Promote this agenda in public policy discussions and advocate the coordination of private and public entities to achieve our overall restoration goal.

To summarize, on water quality enhancement we call for the upgrading of sewage treatment plants to handle increased pollution to the Sound. Coupled with this need, strict direct discharge permits are critical to prevent human and toxic waste from continuing to pollute our waters. The platform calls for expanded and new comprehensive programs to handle non-point or run-off pollution from our developments, streets and other land-based activities. Finally, our government should establish programs to control the input of pollution into the tributaries of the Sound, clean up toxic pollution embedded in our harbor sediments, and even establish controls to combat pollutants falling from our atmosphere.

To protect our coastal resources we must not only preserve existing tidal wetlands, intertidal flats, barrier beaches, coastal uplands and other sensitive coastal resources, but also start to restore the natural habitats already destroyed in our coastal area. These coastal zones are critical to the entire life cycle of the Long Island Sound ecosystem. For Long Island Sound, No-Net-Loss of wetlands is not strong enough. We need Yes-Net-Gain of our wetland resources.

Of course, governmental funding and coordination will be the fuel that drives the implementation of our restoration plans. We need capital expenditures, enforcement capabilities, monitoring, demonstration treatment efforts, new regulatory programs and resources to coordinate these activities. The total price tag for our overdue pollution bill will be in the billions of dollars if we are to restore Long Island Sound's ecosystem. The use of these dollars must be generated from all levels of government, be coordinated and be based on the ecological needs of the Sound.

The National Audubon Society strongly supports and welcomes the legislative initiative entitled the "Long Island Sound Improvement Act of 1989." Through the creation of a Long Island Sound office within the Environmental Protection Agency, the coordination needed to implement the Sound Study and Comprehensive Management Plan is firmly established. Other regions of the United States have obtained great success from this model. A Long Island Sound office within EPA can coordinate activities to restore the Sound, report on progress made to implement plans and monitor existing programs for Long Island Sound clean up. These models, located within the Chesapeake Bay Area and the Great Lakes National Program Office based in Chicago, have been instrumental in moving the restoration efforts of these two water bodies further ahead than any other comparable estuary or freshwater ecosystem in the country. These offices have provided a focal point for discussions, a magnet for grant funds critical to the implementation of restoration efforts, and a catalyst for formal governmental agreements to move the clean up agenda even further. Another plus has been assurance that all levels of government will continue to work together and provide resources to fulfill their responsibility to the effort. Even when existing resources are not adequate or minimal from a certain agency, the coordinating office provides a point of recognition so these concerns can be identified and addressed.

The National Audubon Society also applauds the responsibilities outlined in the Long Island Sound Improvement Act of 1989. It is by no means the end all, but rather a tool to help us reach our clean up goals. In addition to the oversight of the Sound Study, the Act provides for enforcement progress reports and recommendations, administration of research and planning grants to further the goals of the Management Plan and the authority to undertake a series of studies. These studies include emerging issues not covered by the Sound Study process, review of infrastructure needs such as sewage treatment plants and analysis of oil spill contingency plans for the Sound, to mention a few. These and other study areas authorized by the Act ensure that after the Sound Study and Management Plans are completed, the restoration process will be dynamic utilizing new information as it is developed. The direct liaison with the EPA administrator's office and the annual reporting process established for Congress will ensure accountability of not only EPA's efforts on the Sound, but also the other agencies involved. These components have been skillfully designed, taking some of the best elements offered from other National Program Offices of EPA.

The Act includes the themes of accountability, coordination and implementation. With proper financial backing as the specific recommendations come out of the Comprehensive Management Plan and related efforts within the Act, our collective clean up initiatives will be a resounding success. The office can provide the mechanism to ensure that our Sound studies and plans will not just remain on a series of distinguished shelves, but be put to action.

I offer one consideration for the committee and legislators finalizing the Long Island Sound Improvement Act of 1989. The location of the office should not be political, but rather based on resource needs and efficiency. Let EPA along with the other agencies develop a selection committee and process. I have seen the emotional nature of siting a research facility which in some cases has meant that the facility would never be built. Also, don't feel you have to move the office every five years. Keeping a central location for continuity and efficiency is vital to a successful long-term effort. If the central office is located in one state, agreements can be made to have certain field staff located in the other state when the office receives additional resources. Unfortunately, this volatile issue can dissolve all sense of reason, unless it is made non-political early on in the process.

The completion of the Long Island Sound Study, the creation of a Long Island Sound office and the implementation of the Comprehensive Management Plan are all supported strongly by the public. The "public will" for action is growing. Throughout my travels, whether Audubon chapters, other environmental associations, civic organizations and even family or social gatherings, Long Island Sound is "the issue" in Connecticut and on the New York shores of the Sound. I find that the public sentiment has always been ahead of the legislators' in protecting the environment, but recent polls even surprise many of us in the profession. In June, a Gallup Poll reported that the environment was a national priority. Ninety-seven percent of those polled called for more programs to curb pollution and over 80 percent are personally concerned about the condition of our coastal waters. Audubon sees one of its roles as a catalyst to shorten the gap between legislative action and public sentiment. The more we can document the public's concerns and get them involved, the faster the political process can react.

The National Audubon Society, its councils and chapters, look forward to launching our "Listen to the Sound Citizen Mobilization Campaign" in 1990. Through working with many of the organizations here today, National Audubon will host 12-14 citizen hearings that will be held from Mystic and travel to the North Fork of Long Island between Memorial Day and the 4th of July. Our hope is to have every possible organization, concerned citizen and elected official express their view on what needs to be done to restore our Sound.

Once completed, Audubon in consultation with an advisory group of conservation organizations, will pull together all the testimonies into a Citizen Agenda Report to be submitted to EPA, state agencies and all elected officials for consideration. Hopefully, this process will not only make Congress's job easier in gaining support for the Sound, but also provide important insights to the Long Island Sound Study process. Our Citizen Agenda Report will be released at a summit conference we will sponsor in November 1990, 9-12 months before the completion of EPA's Comprehensive Management Plan. In the interest of time, attached to this testimony is a several-page project description for the record.

The National Audubon Society hopes our citizen hearing project will help generate an even greater constituency for the Sound and be a catalyst for increased public involvement and cooperation. We invite your participation to help us make it a successful effort. Together, we have the desire, energy and power to restore this magnificent resource.

The National Audubon Society thanks you for the opportunity to testify today on the ecological and political needs of Long Island Sound. I would be glad to answer any questions now and/or at a later date.

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ATTACHMENT A

Listen to the Sound
Citizen Mobilization
Campaign

Project Description

Project Manager:

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Regional Vice President
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(518) 869-9731

Connecticut, Massachusetts, Maine, New Hampshire, New York, Rhode Island, Vermont
AMERICANS COMMITTED TO CONSERVATION

National Audubon Society's
Listen to the Sound
Citizen Mobilization Campaign

Introduction

The purpose of the Listen to the Sound Campaign is to provide a means for, and to coordinate, citizen concerns on the development and implementation of a federally mandated management plan for cleaning up Long Island Sound. The ultimate goal of the program is to insure that the clean up plan is conceived and accomplished in a way consistent with the environmental welfare of the Sound.

In 1987, Congress passed a strong new Clean Water Act which included provisions for a National Estuary Program to improve the environmental quality of the nation's most important estuaries--provisions that Audubon staff proposed and drafted for the new law. Having suffered years of environmental abuse and degradation, Long Island Sound was one of the estuarine areas slated by the law for clean up. The great estuary has been besieged with water pollution problems stemming from inadequate sewage treatment, run-off from land activities, overdevelopment, and dumping of toxic chemicals.

The Clean Water Act requires the Environmental Protection Agency (EPA) to initiate a study preliminary to developing a clean up plan of the Sound. The law further stipulates that local citizens and citizen organizations be included among the federal, state, and local agencies participating in the study phase and implementation of the plan. Audubon's Listen to the Sound Campaign will provide a citizen record for the responsible agencies and help create and direct a citizen consensus for priority actions needed to restore Long Island Sound. The project has been supported by EPA's Citizen Advisory Committee for the Long Island Sound Study and is looked upon as a guide for their future deliberations.

Audubon's Northeast Regional Office is uniquely qualified to undertake such a campaign. David Miller, Audubon's Northeast Regional Vice President, will be the project manager and oversee the work of a project coordinator contracted for this effort. Mr. Miller was recently appointed to serve on the Citizen Advisory Committee of EPA's Long Island Sound Study Committee and will also serve on the Study's subcommittee on implementation of the plan. On Long Island Sound, Mr. Miller will increase cooperation among citizen interests upon the foundation of an already existing network--the fourteen Audubon chapters active along the shores of the Sound and the additional half-dozen chapters within its watershed. Other local environmental groups have also indicated their wish to participate in this effort and the production of a citizen agenda report from the hearings. These groups include the Sound Keeper, Sound Conservancy, Connecticut Fund for the Environment, Federated Conservationists of Westchester County, Soundwaters, Soundwatch, ACTION, Natural Resource Defense Council and Long Island Task Force.

The campaign is designed to complement federal and state citizen involvement efforts, and officials have supported the project. Campaign activities will include:

Creation and distribution of educational fact sheets on the environmental condition of every major harbor area.

Citizen hearings on the restoration needs of the Sound.

Compilation of a report on the citizen hearings.

A summit conference, including all participating government agencies and citizen organizations, at which the report will be released.

Participation in and monitoring of the implementation of the plan.

It is important to note that the campaign and summit conference will also provide a foundation for long-lasting cooperation and networking among all organizations concerned about the future of Long Island Sound.

Problem and Challenge

The nation's great estuaries are in trouble. For generations they have been the dumping grounds for the refuse and detritus of America's harbor cities--to the point that the ecological viability of Chesapeake Bay, San Francisco Bay, Boston Harbor, Puget Sound, and Long Island Sound are in serious doubt. For this reason, when Congress was debating the new Clean Water Act the National Audubon Society proposed that consideration be given to restoring the great estuaries; and in fact, provisions drafted by Audubon staff were eventually incorporated into the new law.

The law requires the Environmental Protection Agency to establish a National Estuary Program to improve the environmental quality of the nation's most important estuaries. Because the valuable ecological and recreational resources of Long Island Sound are threatened by overuse and pollution, it was among the first four estuaries to be included in the national program. Congress made provisions to fund the clean up, including funds for a preliminary study, development of a plan for the clean up, and implementation of the plan.

EPA has the formal academic phase of the Long Island Sound Study well under way. The study is a six-year project involving federal, state, interstate, and local government agencies, and universities, environmental groups, industry, and the general public. The study will identify the major environmental problems of the Sound and, by 1991, make recommendations for a Comprehensive Conservation and Management Plan.

With the Long Island Sound Study and Plan to be completed by 1991, citizens and citizen organizations need educational materials, a forum to discuss issues, and a non-governmental organization to record their concerns and present them to the appropriate government agencies. Audubon's program will complement government outreach programs scheduled for late 1990 and 1991 and identify key environmental issues that the participating government agencies, because of their limited resources and the selective scope of their study, may fail to address. This represents both the challenge and the opportunity of Audubon's Listen to the Sound Campaign.

Campaign Description

The timing of Audubon's Listen to the Sound Campaign is specifically designed to provide maximum benefit to EPA's Long Island Sound Study. With completion of the draft study and plan scheduled for mid-1991, Audubon's campaign will conduct citizen hearings a year beforehand and issue a full report more than nine months before the agencies have finished their business. Agency staff have assured Audubon's Northeast Regional Office that the campaign would provide useful input to their final deliberations and complement their outreach activities.

In addition, Audubon's Listen to the Sound Campaign will bring together organizations which have been traditionally separated by state boundaries or by Long Island Sound itself. The campaign will provide both the forum and leadership needed to build an ecosystem-wide network to work toward the implementation of the Long Island Sound Study and the Comprehensive Conservation Management Plan.

The restoration of Long Island Sound and the implementation of the federally supported studies will take many years and several billion dollars. The cooperative relationships and teamwork established by Audubon's campaign between the many communities and organizations will help to insure that the plan will not remain on a shelf.

The Campaign will run from January 1, 1990 through December 31, 1990, in three phases:

Phase I will include development and distribution of public education materials.

Phase II will involve organizing and leading a series of 12-14 citizen hearings to discuss the environmental needs and options for restoration of Long Island Sound and to create a public record of citizen concerns.

Phase III will include compilation of a report on the citizen hearings to be followed by a summit meeting, including the government agencies participating in the Long Island Study, at which the report will be publicly presented and discussed.

Audubon's Regional Vice President David Miller will oversee the campaign. Additionally, the Northeast Regional Office will contract a field coordinator who will help direct the activities of local activists. Audubon's network will also provide thousands of hours of volunteer service, without which the project could not meet its objectives.

Phase I: Educational Material and Project Organization (January-May, 1990)

In Phase I of the program, Audubon's Northeast Regional Office will develop educational fact sheets for each harbor area where a citizen hearing is to be held. The fact sheets will provide citizen activists with general background information on the scope and value of Long Island Sound as an ecological and recreational resource, and on the sources of pollution and other threats endangering the Sound. Where appropriate, Audubon will also utilize and assist in the distribution of educational materials created by the Long Island Sound Study Committees and The Sea Grant Institute. This will enable citizens who are new to the issue to actively participate in the hearings.

Mr. Miller and his staff will also develop plans for all 20 Long Island Sound Audubon chapters participating in the organization of the hearings. The hearings will run from Memorial Day to the 4th of July in the year 1990. The actual dates for each hearing will be worked out with participating Audubon chapters and other participating organizations. We look forward to soliciting co-sponsors for the individual hearings, from among the other environmental organizations working on the Sound.

Additionally, we plan to form a Long Island Sound Citizen Panel to record citizen statements made at each hearing (the proceedings will be recorded on audio-tape). The Citizen Panel will represent a cross-section of citizen leaders from around the Sound, within and outside of the Audubon network. Their charge will be to provide guidance and oversight to Audubon staff in preparing the final report on the hearings' findings.

Phase II: Citizen Hearings
May 29-June 29, 1990

The campaign will include 12-14 citizen hearings, held on a tour around Long Island Sound. Each hearing will have the active involvement of one, and in several cases two, Audubon chapters. Our plans call for the hearings to take place in the following potential locales (with supporting Audubon chapters in parentheses) in roughly this order:

1. Mystic-New London area (Pequot)
2. Old Saybrook-Connecticut River Valley (Potapaug-Mattabeseck)
3. Clinton-Guilford area (Menunkatuck)
4. New Haven Harbor (New Haven Bird Club)
5. Milford-Stratford area (Naugatuck Valley)
6. Norwalk area (Saugatuck)
7. Rowayton-Stamford area (Darien-New Canaan)
8. Greenwich area (Greenwich)
9. New Rochelle area (Central Westchester-Yonkers)
10. New York City area (New York City)
11. Great Neck area (Lyman Langdon)
12. Huntington-Oyster Bay area (Huntington)
13. Setauket area (Four Harbors)
14. Mattituck area (North Fork)

Citizen hearings will be scheduled at two or three locations per week from 7:30-10:00 p.m. During the day of each hearing, Audubon staff will arrange for citizen leaders to lead local officials on tours of problem areas around the Sound. At the end of the Listen to the Sound Campaign tour, all statements, materials and tapings of open discussion will be collected for production of the report.

Phase III: Production of Report and Organization
Summit Conference (July-December 1990)

During the months of July, August, September, and early October 1990, Audubon's Northeast Regional Office staff will compile all the materials and information recorded at the hearing and will write a full report. The report will undergo two reviews by the Citizen Advisory Panel to ensure accuracy and establish a consensus for conclusions. Final review will take place in late September and go to press in mid-October.

Audubon staff, with the assistance of the Citizen Advisory Panel and Audubon chapters, will also organize a citizen summit to be held in mid-November. The purpose of the summit will be to provide a forum to review the findings of the report and to develop a long-term structure for participating organizations to work in concert during implementation of the cleanup programs. In this

way, the summit will lay the foundation for sustainable citizen involvement and mobilization for the years to come. Any further organizational needs and follow-up for this effort will be supported and coordinated by Audubon staff through the end of 1990 and beyond, to ensure that a strong working network is maintained.

Audubon views the Listen to the Sound Campaign as a critical juncture for our current activities on Long Island Sound and a foundation for our work for future years. In 1991 and beyond, our Northeast Regional Office and Audubon chapters on the Sound will continue to promote the recommendations of the campaign report, provide leadership in the evolution of a citizen network to restore Long Island Sound, monitor local permits and development proposals, and foster timely and strict implementation of the plan emerging from the EPA study process.

MAYOR
THOM SERRANI

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CITY OF STAMFORD
OFFICE OF THE MAYOR

October 2, 1989

Report to the United States Subcommittee on Environmental Protection on the Municipal Role in the Effort to Maintain and Preserve the Long Island Sound

Submitted by: Thom Serrani, Mayor, City of Stamford, Connecticut

Within recent years, it has become apparent to the municipal officials of the coastal communities bordering Long Island Sound that the very resource upon which they thrive is severely threatened. Each city and town has responded to this crisis in different ways. Some have forged new alternatives in waste water processing, implemented advanced methods of water quality testing, instituted more stringent development requirements, or advocated cost-efficient recycling programs. Some, lacking funding or expertise, have faltered, creating additional obstacles to the efforts of the coastal municipalities to effectively combat the environmental threats to Long Island Sound.

If we are truly committed to preserving the integrity of the fragile ecosystem of the Sound, we, the chief elected officials of the Sound's coastal communities, must commit to working together on an integrated plan. We must collectively support the continuation of the Long Island Sound Study and federal legislation to protect the Sound. We must collectively support education initiatives for our employees, our resident businesses and our citizens. We must collectively support the development of funding sources and alternatives. And we must continue to learn from and cooperate with each other. No one city or town can effectively reverse the deterioration of the Long Island Sound without the support and commitment of the others.

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A commitment to working together is one of the most important tenets of a workable plan for the rejuvenation of the Long Island Sound. However, there is much we can, and must be doing, within the confines of our own municipalities, toward insuring the Sound's future. The City of Stamford, for example, on its own has made significant inroads in the protection of the Long Island Sound. Within the past few years, Stamford has reacted to the crisis of the Long Island Sound by implementing new process control procedures in its waste water treatment plant; initiated a plan to assess and correct sewer hook-ups and drainage problems in order to open one of the city's shellfish beds for the first time in sixty years; promoting recycling programs; initiating stringent water quality testing methods; and insuring careful assessment of waterfront development plans. These initiatives were undertaken, for the most part, with city tax dollars.

Stamford is one of the few municipalities in the State of Connecticut that has two separate sewer systems; one for wastewater and one for storm water. Approximately 85% of the water consumed in Stamford and in the neighboring town of Darien eventually ends up in the sewer system. The Stamford facility consistently achieves a higher level of treatment than that required by the State of Connecticut. While the State requires a discharge of pollutants no greater than 30 mg/1, Stamford's yearly average discharge of TSS (suspended solids) and BOD (biochemical oxygen demand) is 12 mg/1 and 6 mg/1 respectively.

Stamford was able to achieve this level of treatment by implementing what is now known as the "Stamford Baffle" into the secondary clarifier process. The Environmental Protection Agency, concerned about the level of performance of secondary clarifiers, funded a study at the Stamford plant that resulted in the implementation of this new peripheral baffle that is shown to improve solids capture by at least 38% in the types of clarifiers used in Stamford. Many engineering firms are now using these types of baffles when they design clarifiers.

Stamford has placed considerable emphasis on improving our facility as a specific response to our concern for marine life in the Sound. Soon after we heard that scientists were linking "hypoxia", a condition that occurs when dissolved oxygen levels in the water fall below 3 parts per million and cannot support marine life, with nitrogen and phosphorous levels contained in treated sewage, the City of Stamford acted by upgrading their facility to what is called "secondary plus" treatment. At this level, Stamford's facility is now achieving 99% removal of ammonia, approximately 75-85% of total nitrogen and 30% removal of phosphorous. Our initiative has incited significant interest by the EPA which is making approximately $100,000 available to continue this study in New York and Connecticut.

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Stamford also spearheaded a model program to restore shellfishing to Long Island Sound. Alarmed by statistics that showed that as many as 70% of the shellfish beds along the Connecticut coast have been closed due to bacteria, Stamford instituted "Operation Shellfish." Due to the efforts of this program, one of these beds, located in Westcott Cove in Stamford, opened in August after nearly 60 years.

The Operation Shellfish program began in 1985 as a cooperative effort between the Mayor's Office, the Department of Public Works and the Health Department. The program has an average yearly budget of only $50,000 that pays primarily for television, smoke, and dye testing equipment used to inspect the inside of sewer lines for cracks and breaks. In targeting the condition of storm and sanitary sewers in the Westcott Cove drainage area, the City dye-tested every bath and kitchen facility in 900 homes for two consecutive summers to determine illegal connections. After the initial testing phase, the City then made a major commitment to the repair and restoration of these lines, a project that cost, over time, approximately $500,000. The results of Stamford's initiative in this area are tangible; one shellfish bed is now open and the City is now targeting its efforts in order to open an inner harbor beach which has been closed to swimming for several years.

The City also promotes recycling as a long-term solution to the careful maintenance of the Long Island Sound. Because of the high quality of the plant effluent from the waste water treatment plant, the City is able to use it as a coolant and ash quench in the incinerator instead of city water. The City has also initiated Household Hazardous Waste Collection Days, Tire Recycling Days and beach and river clean-up days to promote citizen involvement in the preservation of the Long Island Sound.

In addition, every city along the coast can initiate, as Stamford has done, scrupulous methods of monitoring and testing water quality. During the swimming season, the Environmental Health section of the Stamford Health Department conducts water sampling once-a-week in nine testing sites along Stamford's shoreline to determine water quality. And at least once a day, a Health Department employee personally inspects the shoreline to assess water quality and changes. The Liquid Waste division of the Stamford Department of Public Works conducts water quality testing in 17 sites every other week within the City's storm drain system. On alternating weeks, the Department checks 8 sites. Unlike many other municipalities, both the Health Department and the Public Works Department do test analysis within their own labs, assuring the City of the most timely, cost effective and careful analyses.

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The need for a cooperative effort to bring together the individual efforts of municipalitites became poignantly clear in the summer of 1988 when Stamford's beaches had to be closed to swimming, even though our own treatment facility was continuing to operate in an exemplary fashion. The local municipalities' agreement to coordinate testing procedures and exchange information was a positive result of the crisis, that pointed out more than ever before, the importance of creating a united effort between the coastal municipalities.

In Stamford, the factories and warehouses that once crowded the waterfront have given way to new developments, residents and recreational facilities. While the skyline may have changed, our desire to live, work and play by the shore has not. With scientists believing that the Sound is close to reaching its regenerative limit, it is imperative that we develop effective ways to reduce and absorb the waste stream that do not sacrifice the marine habitats and recreational priviliges the Sound has provided to our residents and guests.

The solutions are expensive and will require hard political, social and individual choices; to fund the approximately $6 billion price tag the Long Island Sound Study anticipates may be necessary to upgrade the 44 treatment facilities along the coastline, to educate government leaders and the public, to promote recycling, and to foster creative thinking and the implementation of innovative programs and alternative methods. And we must provide funding to those municipalities whose facilities require the most help, just as we must continue to provide funding to those cities who are on the cutting edge of new developments and have put their own city funds into upgrading their treatment facilities.

I look forward to working with Senators Joseph Lieberman, Christopher Dodd, and Daniel Moynihan; the State governments of Connecticut and New York; the municipal leadership of the coastal towns and cities; and the citizens of the City of Stamford, Connecticut toward preserving the beautiful and important resources of the Long Island Sound.

Statement of State Senator John Atkin
before the United States Senate Committee
on Environment and Public Works
Subcommittee on Environmental Protection
The Long Island Sound Improvement Act of 1989
October 2, 1989
Bridgeport, Connecticut

Senator Lieberman, and members of the committee. I thank you for the opportunity to appear before you this morning. My name is John Atkin. I am a state senator from Norwalk and represent the shoreline towns of Norwalk and Darien, and serve as the Vice-Chairman of the legislature's Environment Committee, founder and co-chairman of the Bi-State Senate Long Island Sound Caucus with State Senator Owen Johnson of New York, and now an appointed member of the Bi-State Marine Resources Committee.

Three years ago I felt that more attention had to be paid to the conditions of Long Island Sound, and that more had to be done on the state level, with the federal dollars for sewage treatment dwindling, and due to expire in 1991. Not only did more attention have to be paid by Connecticut legislators, but attention on a combined effort with New York State. With this premise I began contacting shoreline senators from both states and did determine that there was great interest in forming such a group and our initial meeting was held. This meeting was followed by a series of public hearings in both states, and ultimately led to the passage of the Bi-State Marine Resources Committee by both states. I will get into a discussion of that body later in the testimony.

The reason for the history of the bi-state efforts is to explain that the next logical step is for the state governments to look at the federal government for assistance. Assistance, not only in dollars, but in the coordination of all efforts. Coordination of the federal, state, county, and local governments, as well as the dozens of concerned environmental groups that have formed to help protect and save this valuable natural resource, some of whom have testified earlier. Additionally, federal assistance in the form of completion of the Long Island Sound Study, and the ultimate production of the Comprehensive Conservation and Management Plan. And since now dealing with the Environmental Protection Agency involves contact with both Regions I and II, in Boston and New York, the bill before you today is the correct approach for the Congress to take.

In comments on the bill itself, I'd like to suggest that in Section 3(b)(1)(F) consideration be given to more public participation on the steering committee than simply the two co-chairs of the Citizens Advisory Committee of the Long Island Sound Study. I always felt that it would be a disservice if the Technical advisory and the Citizens Advisory Committees disbanded at the completion of the study. And as I indicated earlier, there are a number of groups interested in the condition of the Sound, and many come at it from different perspectives. Some are concerned with excessive development, others with wildlife, some as commercial fishermen, and some with the use of the Sound as a waterway for the transport of certain toxic products, etc. Therefore I would hope that the participation from the public could be more than the individuals specified.

In Section 4(g) I couldn't agree more that the Director, through the Long Island Sound Office Advisory Committee should convene conferences for legislators from

State governments and other political subdivisions for the purposes of making recommendations. I would, however, suggest that that particular section have more of a definitive sense of the need of such sessions. This may even include setting dates, such as "on an annual basis", or "twice annually" the members of the Bi-State Marine Resources Committee, consisting of legislators and executive branch official shall meet with the Committee. I think that the meeting(s) spelled out in this subsection are absolutely critical to the coordinating of such efforts to facilitate the environmental restoration of Long Island Sound among the various levels of government, and therefore must be so specified in the legislation.

Section 4(j) deals with the oil spill contingency plans. I agree that this is a critical part of the legislation, particularly in light of the two tragedies this year in Alaska and in nearby Rhode Island. I would suggest, that in addition to soliciting recommendations from the agencies listed, that if permitted under the law local terminal operators, and the coalitions they may have formed provide the director with the recommendations as well. Their input, being on the front line every day, would be invaluable in developing contingency plans.

Section 4(l) dealing with grants to groups related to environmental clean-up and educational programs is an excellent concept. It will not only encourage many more to become involved in the process, but will educate those who need more information.

Section 4(o)(3) starts a discussion of the studies. Subsection (H) in discussing wetland protection issues looks to analyze recommendations for preservation and purchase by the Federal government or other entities, as well as wetlands restorations objectives. Although the states, particularly Connecticut, have local communities who pride themselves in the concept of home rule, I think the the issue of development, and over-development on wetlands has to be addressed. The constant filling of wetlands, and the bulkheading and consequential destruction of wetlands are a major problem for the future of protecting and maintaining the wetlands remaining. A study to ascertain the effect of future development may act as an impetus for the Federal government, or other entities to purchase some of the remaining areas as preserves.

Subsection (K) gets into some recommendations dealing with the shellfish and other wildlife populations. Perhaps this section could be expanded to look at the overall health of the commercial fishing industry in the Sound, and the benefits in terms of jobs and resources the industry brings to the communities it serves. Additional findings could determine the value of the Sound as an area for recreational fishing.

Section 4(o)(4)(B) discusses the demonstration project for nitrogen removal in Norwalk Harbor. This project, I believe is an absolutely critical cog in the entire plan and need of denitrification. The biological nitrogen removal plan, that has been successful in several Chesapeake Bay sewage treatment plants, could be tested in Long Island Sound, a more northerly climate. It could also determine whether the larger size plants that we find in this area, compared to Chesapeake Bay, would be adaptable to this system. Further, an advantage of the Norwalk demonstration project is its locale and the previous testing that's been done in the Norwalk Harbor. The plant sits approximately one mile up from the mouth of the harbor into the Sound so that testing could be done of the effluence before it dissipates into the Sound. Additionally, oxygen and nitrogen testing has been done in five specific areas in the harbor for the last two years, and plans are to continue, so that valid before and after testing could be accomplished.

Finally, the Norwalk Harbor demonstration project is suitable because of the question of long-term funding for denitrification in the entire region. The popular dollar amount bandied about to update the 44 sewage treatment plants dumping effluence into Long Island Sound is in the neighborhood of $6 billion in today's dollars. The cost of the biological denitrification process planned for this demonstration, and successful in Chesapeake Bay, could be as low as 15-20 % of that dollar amount. That could potentially bring the pricetag down to the $1 billion range.

All and all I think the concept of creating a Long Island Sound Program Office is an excellent one to coordinate the efforts, not just within the Environmental Protection Agency, but among the various levels of government.

You also asked that I testify on several other matters this morning, including the Long Island Sound Bi-State Marine Resources Committee and what I see as its goals. The committee, which was formed by identical public acts in both Connecticut and New York, is charged with meeting to discuss and develop legislation and programs to enhance marine resources in the two states. The role of the committee, which is composed of legislative and executive branch officials, including the respective governors of both states, is to make specific recommendations concerning the maintenance, protection and restoration of Long Island Sound. It should also look to the standardization of of laws relating to Long Island Sound, and look at the adverse impact any proposed action might have on the resource. The committee is also required, by law to report to the governors, and the legislatures on an annual basis.

As mentioned earlier, I think that another major role of this committee could be the interaction with the Long Island Sound Office Advisory Committee. This interaction, and coordination between the two levels of government would be critical in the ultimate implementation of the Comprehensive Conservation and Management Plan. I have found that in the less than three years that the Bi-State Long Island Sound Caucus has been in existence, the cooperation between New York and Connecticut has improved. This cooperation and coordination can be expanded to the two levels of government.

Finally, the subject of funding strategies is critical to any massive project like this. I've already discussed the potential for the demonstration project in Norwalk saving in the neighborhood of $5 billion dollars in sewage treatment plant denitrification endeavors. This will obviously mean fewer dollars ultimately needed. The State of Connecticut toyed with the idea this past legislative session of a submerged land leasing proposal. Needless to say it's a concept that needs a lot of research, but has the potential to raise many dollars, looking at the experience of some the seven other states that have such legislation.

Increasing the penalties for illegal dumping, with increased enforcement personnel is a method of raising some of the needed dollars. Finally, consideration will be given by the Connecticut legislature in the next legislative session for a pollution tax, on a per pound basis, on toxins being emitted into the air and water. The proceeds would go directly into the state's Long Island Sound fund. These toxins have been identified and measured in recent federal studies. In addition to this proposal, a "reward" or rebate would be given to the industries who cleaned up their emissions of toxins.

Long Island Sound has been of interest to me since I was a small child, when my folks used to bring me down to the beach to swim. Before that, my father and uncle as teenagers growing up on the north shore of Long Island could pull up live scallops from the bottom of the harbor, the same waters that are today showing zero parts per million of dissolved oxygen, in some parts of the western end of the Sound, according to Connecticut's Department of Environmental Protection. The same waters that show no signs of fin fish, and the only shell fish brought up are dead. The environmental restoration process must start now and I belive that this bill is an important first step in coordinating the effort. Thank you for this opportunity to testify before you today.

Testimony of Dr. Kenneth I. Rubin
President of Apogee Research, Inc.

Before the U.S. Senate Subcommittee
on
Environmental Protection

Bridgeport, Connecticut

October 2, 1989

Testimony of Dr. Kenneth I. Rubin
President of Apogee Research, Inc.
Before the U.S. Senate Subcommittee on Environmental Protection

October 2, 1989

Good morning, my name is Kenneth I. Rubin. I am President of Apogee Research, Inc., a public works economics and finance consulting firm based in Bethesda, Maryland. I offer my remarks today in support of state and local estuary managers from across the country with whom I have had the good fortune of working over the last three years.

In my testimony, I would like to focus on three issues:

- The application of the principals of public finance to estuary protection programs;
- Financial planning needs to support implementation of the Long Island Sound management plan; and
- Key financial considerations as plans move from paper recommendations to programs in the field.

Before presenting my views on these topics, however, I would like to provide some background on Apogee's work in environmental finance.

APOGEE RESEARCH

In July 1986, Apogee initiated an ambitious three-part project to help EPA's Office of Marine and Estuarine Protection (OMEP) integrate financial planning into their well-established procedures to develop estuary-specific management plans. Prior to our work, restoration plans focused mostly on the science of clean-up -- what had to be done, by whom, and by when. Little if any analysis examined the issues of how much clean-up would cost, who should pay for it, and how.

Scientists responsible for identifying the extent of contamination and the steps necessary to restore estuarine resources often assumed that the federal government or the affected states would somehow appropriate the funds needed to implement their technical recommendations. In practice, this rarely happened and good plans merely sat on the shelf.

The purpose of our work was to help estuary managers assure that adequate financing would be available to implement their restoration plans. Recognizing that federal budget pressures and the growing competition for state and local funds could seriously limit funding from traditional sources, our work was designed to familiarize estuary managers with the concepts and jargon of public finance so that they could compete more effectively and creatively for funding.

As our products matured from broad-based technical assistance documents to estuary-specific financing plans, we made the link more carefully between the realization of environmental improvement and specific options to secure funds, manage them, and institutionalize financial planning and management. This process took shape in three stages. In the first stage, we produced several resource guides for scientists and program managers explaining why financial planning was essential to their work and how to evaluate alternative sources of revenue, create secure financial management mechanisms, and help promote financial management institutions to oversee financing activities.

In stage two, we conducted a series of financial planning lectures, seminars, and workshops with estuary and coastal managers in Puget Sound, the Gulf of Mexico, Sarasota Bay, Chesapeake Bay, the Delaware River Estuary, Long Island Sound, and Narragansett Bay.

We are now in the third stage, in which we are producing estuary-specific financing plans to raise and manage funds needed to clean-up these unique resources. We have completed or are now working on the financing plans for Puget Sound, Long Island Sound, and Narragansett Bay.

In related work, we have published several books on innovative financing of local public works, guidance to local governments on creating public-private partnerships for environmental facilities, and numerous analyses of financing options for individual public works projects and entire environmental protection programs.

THE INTERACTION BETWEEN PUBLIC FINANCE AND ENVIRONMENTAL PROTECTION

Financing environmental programs would be easy if resources were unlimited. But because they are not and because decision makers confront many demands for every public dollar, resource managers must learn to compete. In the 1970s when environmental concerns captured the nation's attention, the public simply assumed that big government would pay much of the cost of environmental improvement and industries that contributed to degradation would pay the rest. Today according to every new public opinion poll, the public is no less concerned with environmental improvement, but with good cause, they question where the money will come from.

In 1987, for example, all governments in the United States spent a total of $40 billion on environmental protection. According to our best projections, simply maintaining today's level of environmental quality will cost $55 billion a year by the year 2000. Accounting for the cost of new environmental programs that are on the books but that have not yet been implemented adds another $5.3 billion a year by 2000 in municipal expenditures alone.

Perhaps more important, however, under current policies, local governments will pay 82 percent of the cost of environmental protection in 2000 compared to 75 percent they paid in 1980. The federal share will drop from 19 percent in 1980 to 8 percent in 2000.

Just as funds are scarce to build local facilities, state program managers face comparable needs for administration of water programs. EPA and the states estimate that by the mid-1990s the new requirements of the 1986 amendments to the Safe Drinking Water Act and the 1987 amendments to the Clean Water Act will result in a gap of some $250 million a year between what the states now spend to implement their water programs and what they will have to spend for full implementation.

Clearly the nation faces a formidable, but in my view, a manageable challenge if we are to pay for the level of environmental quality we demand in public opinion polls. Sound financial planning is the key to managing this challenge

Four Components of Financial Planning

At the expense of oversimplifying the livelihood of an entire industry, let me present my views on what it takes to plan for adequate financing of estuary clean-up initiatives. One need only answer four questions:

- How much will it cost?
- Where will the money come from to pay the bills?
- How will the money be managed? and
- What institution is needed to oversee financial transactions?

The answers to these questions are not entirely distinct. The cost of a technical initiative, for example, depends in large part on who is paying for it and how the funds are managed. In a recent study, we showed that when local governments paid a greater share of the cost of building secondary wastewater treatment plants, the unit costs of treatment declined. In particular, the recent increase in the local share under EPA's Construction Grants Program from 25 percent to 45 percent resulted in an average savings of nearly one third of average construction costs. More efficient investments were realized because higher local resources at stake imposed fiscal discipline, a broader search for low-cost solutions, more rigorous local oversight, and shorter construction periods.

Case studies on the local decision making process to build treatment plants have demonstrated that as long as costs to the community are low, few cost-saving decisions are made. But as financial responsibilities on communities grow, in turn, increasing expected local sewer fees, citizen concern increases pressure on local officials to reduce costs. They, in turn, examine simpler, low-cost technologies; limited construction of unused, reserve capacity with attendant maintenance cost savings; and interconnection of neighboring systems to reduce costs through economies of scale.

The scope of many authorized water resources development projects was reduced drastically after new cost-sharing provisions were implemented in 1986. Prior to cost sharing, the federal government was obligated to finance the full cost of four large harbor deepening projects (Baltimore Harbor, Norfolk Harbor, Mobile Harbor, and New Orleans/Baton Rouge) totaling $1.7 billion. Under recent cost-sharing reforms, local port authorities were asked to pay up to half the cost of deepening and recover their investment with local user fees. Faced with these new costs, each port authority chose a more modest (shallower, narrower, and shorter) project at a combined savings of $1.1 billion.

The lesson to be learned from these examples is plain: who finances and who pays for public investments can significantly affect the cost of clean-up and the benefits derived from public expenditures.

Formulating Acceptable Financial Plans

A successful financial plan is one that provides answers to the four questions presented above that the public and other affected interests will support. The public requires assurance that the benefits from cleaning up their coastal waters are well worth their costs; that the burden of paying for clean-up is distributed equitably among polluters and beneficiaries; that funds once collected will be managed responsibly; and that both public and private interests have committed institutionally to both restoration and continued protection (pollution prevention).

How a financial plan measures up against these basic criteria will largely determine whether or not the public will accept the plan.

In our estuary work, we have found it useful to formulate separate plans for separate clean-up activities. In Puget Sound, for example, in the interest of equity, clean-up initiatives were divided roughly into those that would have widespread, statewide benefits and those with more localized effects. To finance the statewide initiatives, we examined broad-based sources of funds (taxes, for example), centralized funds management, and a coordinated statewide management institution. To finance the local clean-up initiatives, we focused on local sources of funds (stormwater control fees, for example), which would be managed at the county or municipal level by either existing government units or newly created local water quality management utilities. Initial public review of this separation has been favorable.

FINANCIAL PLANNING NEEDS IN LONG ISLAND SOUND

Apogee Research is currently working with EPA Regions I and II and the states of New York and Connecticut to establish a Finance Steering Committee, whose charge is to oversee the development of a financing plan for nutrient control in Long Island Sound. Once formed, we look forward to the Steering Committee's guidance as we develop options to fund the reduction of nutrient loadings to the Sound. We expect to complete our study by mid-Summer of next year.

While the Committee is still forming, experience in other estuary programs suggests the following representation:

- Local elected officials,
- State agency representatives (water program and departments of revenue),
- Representatives of the state legislatures,
- Representative public interest groups,
- Members of the public finance community (investment bankers, bond counsel), and
- Representatives of business and commerce.

Focus on Nutrient Controls

Of the three major problems facing the sound -- hypoxia, toxics contamination, and fish/shellfish populations -- our financing study is limited to hypoxia. In particular, we will focus our attention on options to finance the reduction of nutrient (nitrogen and phosphorus) loadings to the Sound. The types of technical clean-up initiatives for which we will probably evaluate financing options include wastewater treatment plant upgrades, control of fertilizer application, stormwater control, the correction of combined sewer overflows, and control of rural runoff.

Using the technical work of the Long Island Sound Study as our foundation, Apogee expects to focus on the capital and operating costs of specific nutrient control measures. Typically, we would inventory and match sources of funds and financial management options to the cash flow demands of these measures and evaluate each on the basis of future availability, effectiveness, equity, and impacts on government and private sectors. Our analysis will also identify legislative, administrative, and public participation requirements for implementation. Bi-state funding issues are a particular concern.

Lessons to Guide Financing Options for Long Island Sound

While it is clearly too early to predict what level of funding may be needed or how to secure and manage revenues in Long Island Sound, we can borrow from our experience in other estuaries. The key principle guiding our past work is that no single source of funds could possibly be expected to satisfy every interest or distribute the burden of payment fairly. Instead, all levels of government and the private sector must come to appreciate the benefits of improved water quality and demonstrate their willingness to pay their fair share through a balanced mix of funds.

In Puget Sound, for example, our finance committee identified a need for some $40 million a year in new revenue to implement their clean-up plan.[1] The committee's draft report reviewed more than two dozen options and recommended four new funding mechanisms:

- State taxes and fees on motor vehicle manufacturing, the harvesting of foodfish and shellfish, aquaculture activities, marine fuel sales, and the leasing of state lands, which in the aggregate are designed to raise $6.6 million a year;
- Local water quality utility revenues and increased local taxes designed to raise between $17 million and $21 million a year;
- A Puget Sound regional fee paid by all households in the drainage basin, which would raise between $8 million and $15 million a year; and

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[1] Puget Sound's funding needs do not include the costs of building and upgrading wastewater treatment plants.

- **A Puget Sound Foundation**, which would raise $2.5 million a year from private donations, bequests, grants, awards, fines, penalties, sales of a Puget Sound decal, and income from a Puget Sound "affinity" card.

Each source would be as well matched to intended uses as possible, given the overlap in jurisdictions and revenue raising authorities. For example, the state tax revenues would support broad water quality protection programs such as water quality monitoring and public education. Local funds would finance stormwater control programs or septic maintenance districts.

The Puget Sound Foundation would fund research projects intended to benefit the restoration of the Sound's living resources. The Foundation would also finance long-range education activities to build a pollution prevention ethic within the Puget Sound drainage basin.

The Puget Sound Regional fee would underwrite a wide variety of state and local clean-up initiatives including water quality monitoring, non-point source controls, sediment restoration, analytical laboratory services, and household hazardous waste management. Legislative and voter approval would be required to authorize these regional fees, which at about $12.50 per household per year, would generate the target $15 million a year in revenues.

Our work in Narragansett Bay is not as far along as it is in Puget Sound, but it is safe to say that the same principle will prevail in financial planning -- that all levels of government and the private sector must contribute their fair share to cleaning up the Bay. In an early inventory of funding sources that could be applicable to projects in Narragansett Bay, we identified potentially applicable federal loan and grant programs; opportunities to use or expand current state taxes and fees and to develop new ones; the potential to apply unused or under-used local authorities to impose user fees, impact fees, or taxes; and the potential to engage private vendors in public-private partnerships to help finance municipal wastewater treatment plants.

Each of these sources was analyzed for its applicability to fund municipal point source controls, combined sewer overflow remediation, industrial pretreatment, urban and rural non-point source control, and on-site septic system controls.

By the end of October, we expect to complete a series of four financial planning demonstration projects. These "mini financial plans" will evaluate options to fund some of the priority activities likely to be included in Narragansett Bay's CCMP:

- **A baywide water quality monitoring program;**
- **Local enforcement of environmental statutes, with a focus on stormwater management and soil erosion/sedimentation control;**
- **Retrofit of regional storm drains and other structural non-point source controls; and**
- **Upgrade of municipal wastewater treatment plants for nutrient removal.**

While none of the following options is necessarily appropriate for the Long Island Sound region, other locales have successfully implemented coastal protection plans supported by a wide variety of funding approaches:

- **A 2 percent real estate transfer tax raises $5 million to $6 million a year to purchase critical shoreline for conservation in Nantucket, Massachusetts;**
- **A 3 percent occupancy tax on lodging in Dare County, North Carolina raises over $1 million a year for water and sewer improvements;**
- **Tax increment financing in Orlando, Florida raises over $2 million a year for improvements to wastewater treatment plants and a similar program has been proposed to fund the protection of critical areas adjacent to the Chesapeake Bay;**
- **Over $1 million a year in sportfishing license fees are dedicated to native fish management programs in Maryland's Chesapeake bay;**
- **The sale of capacity credits raised $11 million in Houston, Texas to fund wastewater treatment upgrades;**
- **Escondido, California raised $12 million from the sale and marketing of as yet unbuilt units of capacity in a regional wastewater treatment plant.**

If these or similar measures were taken in the many jurisdictions comprising Long Island Sound, considerable revenue could be generated.

MOVING PAPER PLANS TO PROGRAMS IN THE FIELD

Understanding the options to secure funding for estuary restoration is only one of the early steps in assuring that clean-up actually takes place. To be sure, the science must be credible – recommendations on what needs to be done must be beyond reproach.

Both these efforts are likely to fall short of implementation, however, in the absence of two key components. First, the public must be convinced that the benefits they will receive from restored water resources are well worth the price they will have to pay both from their own pocketbooks and in terms of regional economic changes as industrial and commercial resources are committed to environmental restoration.

When all is said and done, regardless of how creative or innovative financial proposals may seem, the source of all public finance is personal wealth. Financial schemes may adjust in time who finances and who pays or they may redistribute the burden of payment from one group of users to another, but one way or another, you and I and all of our neighbors will be asked to write a check to clean up the Sound. When we face this request, we had better be thoroughly familiar with what we are buying and we had better be assured that the amount of our check is comparable to the checks that others are writing, or our programs will fail.

Second, because estuarine water quality and many estuarine resources are public goods -- individuals cannot own or market them -- all affected interests must be assured that government will take charge of their stewardship, and protect them for public use. In Long Island Sound with two directly adjacent states and others upstream contributing to water quality problems, it may be relatively more difficult to assure the public that a single government entity can assume such broad responsibilities. Yet committed leadership at the top is critical to the implementation of any financing plan.

This suggests the creation of a permanent institution to oversee the implementation of the Long Island Sound CCMP and the continued protection of the Sound and its resources.

CONCLUSIONS

Financing the restoration and continued protection of Long Island Sound poses a formidable, but manageable challenge. It will require a long-term commitment of funds and professional resources. The magnitude of public investment needed to clean up the Sound is likely to be significant, but it need not dominate the debate over whether to go forward. Congress, the states, and many local governments have already made that decision.

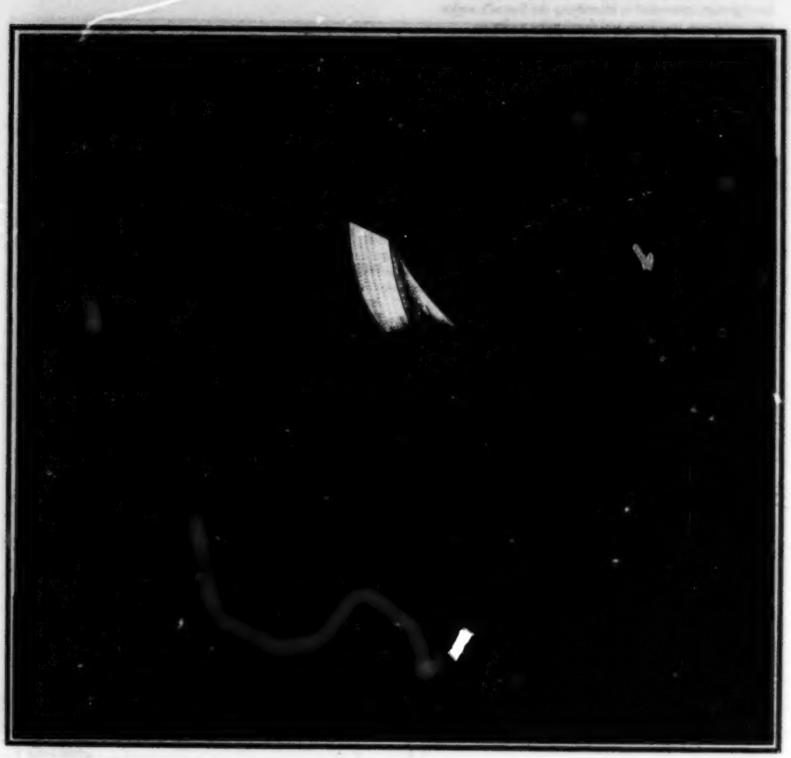
Our experience working with estuary program managers, the finance community, and the public suggests that successful restoration programs rest on several key elements:

- **A firm understanding of sources of degradation and the remedial activities needed for restoration and continued environmental protection;**
- **Clear communication of the benefits of clean-up to the public, to local governments, regional industry, state legislatures, and the U.S. Congress;**
- **Financial plans that fully disclose the costs of different levels of restoration and that balance revenue collection with the willingness of public and private interests to pay for clean-up;**
- **Responsible management of funds, with direct accountability for environmental results; and**
- **The commitment of both public and private interests to long-term institutional leadership to oversee the implementation of clean-up plans.**

LONG ISLAND SOUND STUDY

Annual Report

1988



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OVERVIEW OF THE LONG ISLAND SOUND STUDY

The year 1988 marks the halfway point for the Long Island Sound Study (LISS). Established in 1985, the LISS is a six-year partnership of federal, state, and local groups interested in identifying the Sound's major environmental problems and developing a plan to manage those problems.

In 1988, the direction of the LISS turned toward defining a framework for the Long Island Sound management plan. The outline was prepared by LISS staff in consultation with the Management and Citizens Advisory Committees and received formal approval in March 1989. Officially known as the Comprehensive Conservation and Management Plan (CCMP), the plan will address the predominant problems facing the Sound, namely, hypoxia (low dissolved oxygen), toxic contamination, and the health of the Sound's fish and shellfish. In addition, the plan will make recommendations about the control of pathogens and floatable debris in the Sound's waters. LISS participants decided to include these last two topics because of their potential effect on beaches and shellfish beds around the Sound.

The section concerning the Sound's hypoxia problem will be an important part of the management plan and is expected to be completed in advance of the Study's end date of 1991. To ensure rapid implementation of management actions, the LISS Policy Committee has called for the identification of measures that, starting on October 1, 1990, can be taken to control nutrients and begin alleviating hypoxia.

Although research and data collection continue in 1989, our principal task for the year is to translate the information and ideas generated over the past three years into an effective, action-oriented management plan for the Sound. As informed, concerned citizens, you can help those ultimately responsible for putting the management plan into practice gain a true appreciation for the Sound and its resources. We urge you to get involved!

Michael R. Deland

Michael Deland

Regional Administrator,
EPA Region I

William J. Muszynski

William Muszynski

Acting Regional Administrator,
EPA Region II

Leslie Carothers

Leslie Carothers

Commissioner,
Connecticut Department of Environmental Protection

Thomas Jorling

Thomas Jorling

Commissioner,
New York State Department of
Environmental Conservation

WHO MANAGES THE LONG ISLAND SOUND STUDY ?

Organization of the Long Island Sound Study

Policy Committee

The Policy Committee has overall responsibility for the Study, including approval of goals and the Comprehensive Conservation and Management Plan. The committee includes the Regional Administrators from EPA Regions I and II, the New York State Commissioner of Environmental Conservation, and the Connecticut Commissioner of Environmental Protection.

Management Committee

The Management Committee develops goals, approves work plans, and plans and oversees projects. Its members are from EPA, the New York State Department of Environmental Conservation, the Connecticut Department of Environmental Protection, the Interstate Sanitation Commission, and the National Oceanic and Atmospheric Administration, and include Co-Chairs of the Technical Advisory Committee (TAC) and Citizens Advisory Committee (CAC).

Technical Advisory Committee

The Technical Advisory Committee serves as a forum for technical expertise on Long Island Sound. The TAC advises the Management Committee on scientific and technical aspects of the Study. Scientists and managers from federal, state, and local government and from universities provide technical input and support, and participate in various activities.

In order to focus the Committee's attention more on the CCMP and its implementation, the LISS recently reorganized the TAC into nine working groups: the Modeling Evaluation Group, Point Source Working Group, Non-Point Source Working Group, Toxics Working Group, Living Resource Working Group, Floatables Working Group, Pathogens Working Group, Dissolved Oxygen Endpoint Advisory Team, and Data Management Working Group. The TAC will be composed of two members from each working group and a few members-at-large. It will be chaired by the current TAC Co-Chairs.

Citizens Advisory Committee

The Citizens Advisory Committee includes representatives of citizen and user groups interested in Long Island Sound. Its role is to communicate citizen concerns about the Sound and the Study to the Management Committee, provide advice on public education activities, build a constituency to support the development and implementation of the CCMP, and generally provide a broader perspective for managing the Study.

In 1988, the CAC continued to expand its membership and established three subcommittees on Public Outreach, Water Quality, and Implementation. These subcommittees have undertaken specific projects that will contribute significantly to the LISS in 1989 and beyond. These projects and other CAC activities are being closely coordinated with those of the public education coordinators at Sea Grant, the Long Island Sound Task Force, the Long Island Sound Legislative Caucuses, and the recently established Bi-State Marine Resources Committee.

LIS Designated as Estuary of National Significance

Long Island Sound's status as one of this country's most important natural resources was reflected in its March 1988 designation as an estuary of national significance in EPA's National Estuary Program (NEP). This conference agreement has resulted in continued federal funding for the LISS in addition to the 25 percent matching funds pledged by the states of New York and Connecticut.

The NEP is designed to provide assistance to nationally significant estuaries that are threatened by pollution, development, or overuse. The inclusion of the Long Island Sound Study in the NEP was a major step toward ensuring that the Sound is protected for future generations.

Legislative Concern for the Sound

Without legislative concern and support, the Long Island Sound Study would not be where it is today. In 1985, federal legislators, particularly in the Senate, called for the establishment of the LISS, and support on the federal, state, and local levels continues to increase. Much of this legislative interest was given formal structure in 1987, with the establishment of a Long Island Sound Caucus in the U.S. House of Representatives and then with a bi-state senatorial caucus and task force and a county coalition. To further enhance ongoing bi-state cooperation and coordination, in 1988 the Connecticut and New York General Assemblies enacted into law reciprocal legislation establishing a Bi-State Long Island Sound Marine Resources Committee. The Committee, whose membership includes state legislators, the Governors and environmental officials from both states, will seek to coordinate and recommend standardization of all laws relative to Long Island Sound and to consider how actions proposed in or for the Sound could affect its marine resources. Reports on the Committee's activities and recommendations will be prepared annually and submitted to the Governors and respective state legislatures.

Photograph by Arthur Glowka.

Statement from Connecticut U.S. Senators

The Long Island Sound's status as one of our nation's most important natural resources is reflected in its March 1988 designation as an estuary of national significance in EPA's National Estuary Program. Thousands of citizens take part in residential and commercial activities which depend on a clean Sound, but this valuable estuary clearly is threatened by serious pollution.

We applaud and endorse the efforts of those groups involved in the Long Island Sound Study. Since 1985, participants from federal, state, interstate, and local agencies, universities, environmental groups, industry, and the general public have been working together to identify the major environmental problems of the Sound. The projects undertaken to date already have provided a better understanding of the Sound's environmental problems—knowledge that will allow the study group to develop the recommendations for preserving the Sound's water and resources.

The signing of the Conference Agreement on March 28, 1988, by the states of Connecticut and New York along with the Environmental Protection Agency will allow the Study's recommendations to be set into motion. We look forward to 1991 when the Comprehensive Conservation and Management Plan is completed and the most important phase of the project can begin—implementing the findings of the study so that the actual cleanup of the Sound can begin.

In the meantime, we pledge our continued support of the Long Island Sound Study in the Congress and commend and encourage the continued efforts of all those dedicated individuals who are working for a cleaner, safer Long Island Sound.

Chris Dodd

Christopher J. Dodd
United States Senator

Joseph I. Lieberman
United States Senator

Statement from New York U.S. Senators

The Long Island Sound Study, now in its fourth year, has made great strides in identifying and understanding the sources of pollution in the Sound. We take great pleasure in commending all of those involved in this most important endeavor.

The quality of life on Long Island is so dependent upon its coastal waters...especially the Long Island Sound. Year round, the Sound attracts thousands of citizens for fishing, boating, and swimming. The aim of the Study is to improve the health of this precious resource upon which so many people depend.

We pledge to continue our support of the Long Island Sound Study in the Congress and do all that we can to ensure a healthier, safer, and more enjoyable Long Island Sound.

Alfonse M. D'Amato
United States Senator

Daniel Patrick Moynihan
United States Senator

Statement from the New York State Assembly Subcommittee on Marine Resources and Long Island Sound

In 1988, the Assembly Subcommittee on Marine Resources and Long Island Sound conducted a series of hearings on pollution in our troubled Sound. Since that time, there has been a new awareness on the part of Legislators from around our State about the serious problems facing the Sound. There is now a growing consensus that bi-state and federal action and cooperation is needed quickly in order to preserve and protect this vital environmental, recreational, and economic resource.

We will continue to work at the State level to improve our inadequate sewage treatment infrastructure, to reduce recreational and industrial pollution, and to protect our important tidal wetlands.

We hope to work closely with the Long Island Sound Study staff and advisory committees, and with our counterparts in the Connecticut Legislature to help make sure that New York State does its share to protect Long Island Sound for present and future generations.

Assemblyman Thomas D. DiNapoli, Chair

James F. Brennan
Assemblyman

John L. Behan
Assemblyman

Statement from the Long Island Sound Caucus of the U.S. House of Representatives

The Congressional Long Island Sound Caucus is composed of the ten members of the United States House of Representatives whose Congressional districts abut the Sound. Over its first two years of existence, we have been successful in increasing the federal appropriations provided for the Long Island Sound Study to approximately $3 million.

Now that the Study has reached its half-way point, we will continue to monitor appropriations and agency allocations to ensure adequate funding for its full five-year life. Once the Study is completed, we will work for prompt implementation of its recommendations and a fair level of funding.

However, our most important goal is to develop public awareness of the problems facing the Sound and to foster public participation in their solution. We look forward to continuing our work with state and local officials and community and environmental groups concerned with the Sound. In the long run, public involvement at the grassroots level will be the key to cleaning up the Sound. Experience has taught us that laws are most successful when they have the support and backing of local communities and interested citizens.

The Clean Water Act and the National Estuary Program provide the legislative authority to clean up the Sound. After the events of the summer of 1988, public consciousness about the Sound is on the rise. We are optimistic that the recommendations of the Study will provide the framework for effective action before it is too late.

We commend you who are conducting the Long Island Sound Study. We have been impressed by the dedication and cooperation of the staff. Your efforts will do much to ensure that the Sound will continue to play an important role in the economic and social life of the region. We thank you and wish you continued success in this effort.

Bruce A. Morrison
Member of Congress
Co-Chairman, Long Island Sound Caucus

Robert J. Mrazek
Robert J. Mrazek
Member of Congress
Co-Chairman, Long Island Sound Caucus

George J. Hochbrueckner
Member of Congress

Claudine Schneider
Member of Congress

Sam Gejdenson
Member of Congress

James H. Scheuer
Member of Congress

Robert Garcia
Robert Garcia
Member of Congress

Christopher Shays
Member of Congress

Eliot L. Engel
Eliot L. Engel
Member of Congress

Nita M. Lowey
Member of Congress

Statement from the Long Island Sound Bi-State Marine Resources Committee

The Long Island Sound Bi-State Marine Resources Committee, established by law in the states of Connecticut and New York, is ready to begin to work on implementing recommendations of the Long Island Sound Study to protect and preserve this estuary for future generations to enjoy. The joint committee is comprised of the Governors Mario M. Cuomo (NY) and William O'Neill (CT), Secretary of State Gail S. Shaffer (NY), Commissioners Thomas C. Jorling (NY) and Leslie Carothers (CT) of the Environmental Departments of each state, and Arthur Rocque, Director of Coastal Area Management (CT). State legislators appointed to the Committee from New York are Senators Owen H. Johnson, Michael J. Tully, Jr. and Saul Oppenheimer and Assemblymen Thomas P. DiNapoli, Maurice D. Hinchey, and James D. Conte. State Legislators appointed from Connecticut are Senators John Atkin, George Gunther, and Steven Spellman, and State Representatives Robert Frankel, Jay Levin, and Sidney Holbrook. This Committee will meet formally and regularly to discuss and develop legislation and programs to enhance marine resources in Long Island Sound and to protect this estuary from pollution pressures. Research efforts are under way which will provide the Bi-State Committee with information to make wise management decisions and form policies on issues pertaining to Long Island Sound.

In both the New York and Connecticut legislatures, efforts are being made to address concerns with sewage treatment plants which may be contributing to the hypoxia problem in western Long Island Sound. The development of a mathematical water quality computer model of this estuary will be a useful tool to determine cause and effect relationships between wastewater discharges and water quality in order to determine what waste load reductions are necessary to prevent hypoxia events. The Bi-State Committee will keep close contact with scientists to learn what research is revealing about man's impacts on the Sound and what mitigation and preventative measures need to be taken to minimize and abate these impacts.

Public education and support will be of primary importance in developing a Comprehensive Conservation and Management Plan. The Bi-State Committee will meet with citizen groups to address their needs and concerns about the Sound. Legislators on the committee will continue to hold public hearings and information sessions on legislative initiatives pertaining to Long Island Sound.

As Senators of New York and Connecticut, we look forward to working together to protect Long Island Sound. The establishment of this bi-partisan Committee, uniting both the executive and legislative branches of government of both states, will, we believe, enable New York and Connecticut to successfully implement the recommendations of the Long Island Sound Study in a timely fashion.

Owen H. Johnson
Senator Owen H. Johnson,
New York

John Atkin
Senator John Atkin,
Connecticut

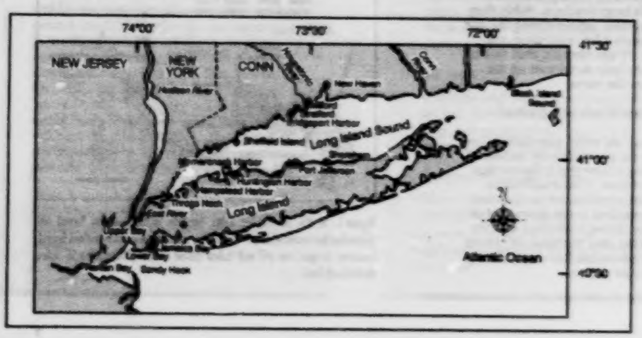
WORK IN 1988 & THE MANAGEMENT PLAN

From the beginning of the Long Island Sound Study we have been conscious of the need to apply our results to practical approaches for improving conditions in the Sound. In 1988, at the halfway point of the Study, we are continuing to narrow the focus onto how the information we have gathered can be related to the management of the Sound. The Comprehensive Conservation and Management Plan (CCMP), which will be completed in 1990-1991, represents the blueprint for effective management.

LISS research to date has determined the focus and organization of the CCMP as reflected in the CCMP outline (see box). This outline will undoubtedly evolve; however, it represents LISS's first major step toward the translation of LISS research findings into prescriptions for management actions. In light of the Study's growing focus on implementation, the annual report's discussion of technical work conducted in 1988 is organized to reflect the structure of Section IV of the CCMP outline.

Outline for the Comprehensive Conservation and Management Plan

- **I. Executive Summary**
- **II. LISS in Perspective**
    - **A. Description of Sound/Basin**
    - **B. LISS Problems**
    - **C. Past Planning Efforts**
    - **D. LISS**
    - **E. Public Involvement in Developing the LISS**
    - **F. LISS Goals**
    - **G. Organization of CCMP**
- **III. Assessment of Existing Programs**
- **IV. Priority Issues/Management Solutions**
    - **A. Hypoxia**
    - **B. Toxics**
    - **C. Living Marine Resources**
    - **D. Pathogens**
    - **E. Floatables**
- **V. Emerging Issues**
- **VI. Integrated Monitoring Plan**
- **VII. Management Structure for Implementation and Evaluation of Program**
- **VIII. Public Involvement in Plan Implementation**
- **IX. Public Education**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Sheffield Island
Long Island Sound
Mamaroneck Harbor
Port Jefferson
Huntington Harbor
Hempstead Harbor
Throgs Neck
East River
Long Island
Upper Bay
Jamaica Bay
Lower Bay
Sandy Hook
Block Island Sound
N
Atlantic Ocean

HYPOXIA (LOW LEVELS OF DISSOLVED OXYGEN)

Hypoxia, or low dissolved oxygen (see box below), has emerged as an issue of great concern in Long Island Sound. When levels of oxygen dissolved in seawater drop below 3 parts per million, some fish and mobile invertebrates such as lobster, crab, and shrimp may move out of the area. Those that remain may suffer ill effects or die. We believe that the problem is intensified by excess nutrients entering the Sound from sewage treatment plants, runoff, and the atmosphere.

Facts About Hypoxia

What Is Hypoxia?

Most marine animals depend on oxygen, just as we do. Instead of oxygen in the air, however, these organisms use oxygen dissolved in the water they live in. *Hypoxia* is the condition that exists when the amount of dissolved oxygen in the water falls below a certain level, defined as 3 parts per million.

Most animals living in oxygen-depleted areas will suffer stress and eventual suffocation. If the size of the hypoxic area is not too great, fish and other mobile animals may leave the area, but forms with less mobility will be trapped and die if low oxygen levels are prolonged.

What Uses Up Oxygen in Water?

Hypoxia is the result of a chain reaction that begins with nutrients. Nitrogen and phosphorus are nutrients needed by microscopic plants called phytoplankton. If there is an excess supply of nutrients, phytoplankton can grow in unusually large numbers. While they are alive, they produce oxygen during the day, but they also require it for respiration, particularly at night. When they die, they sink to the bottom, where their decay uses up still more oxygen from the water.

Is Hypoxia Always a Result of Pollution?

Hypoxia can occur naturally, especially in summer. Heat from the sun warms the surface of the water, forming a layer that is lighter than the cooler water below. This stratification reduces mixing between surface and bottom waters, so oxygen added to the upper part of the water column, through interface with the atmosphere and the photosynthesis of marine plants, is largely prevented from replenishing the oxygen in deeper waters.

In its own research and in its analyses of historical data, the LISS has determined that hypoxia is more of a problem in the western half of the Sound. In the summer of 1987, scientists from the University of Connecticut found that hypoxia was particularly severe and widespread. In 1988, hypoxic conditions were slightly less severe (Figure 1), but the waters west of Bridgeport and Port Jefferson still had oxygen concentrations below acceptable levels. We cannot state that the situation is improving just because hypoxia was not quite as bad in 1988 as in 1987. Conditions vary from one year to the next, and no trend is evident: 1987 was worse than either 1986 or 1988. If we act soon to reduce the flow of nutrients to the Sound, 1987 may represent a *worst case* scenario.

We believe that effluents discharged into the Sound from sewage treatment plants are contributing to the Sound's problem of hypoxia. These effluents contain nitrogen and phosphorus, nutrients that can stimulate the growth of phytoplankton (microscopic plants) and result in oxygen depletion (see box at left). However, the cost of upgrading sewage treatment plants to remove nutrients is so high that, before we recommend this management action, we must be reasonably sure that it would substantially improve conditions in the Sound.

To improve our understanding of what is causing hypoxia and which solutions would be effective, we are developing computer models of the Sound. A computer model of a body of water uses sets of mathematical equations to describe the biological, physical, and chemical processes at work in the system. Two models are being developed for Long Island Sound: one will describe water quality (water quality model), and the

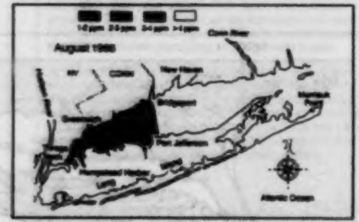


Figure 1. In the summer of 1988, hypoxia in Long Island Sound was somewhat less severe than in the previous year. In parts of the western Sound, however, oxygen was still well below critical levels. (From John St. John, HydroQual, Inc.)

other will describe the circulation of the Sound's waters (hydrodynamic model). Run together, the two will be used to evaluate options for management of the Sound. The computer models can be used to answer questions such as the following:

- If we reduce nitrogen by a given percentage in the effluents from some or all sewage treatment plants in the Sound, how much of an improvement in dissolved oxygen levels can we expect?
- Will management of sewage treatment plants correct the problem or will even more difficult management of runoff from land and deposition from the atmosphere be necessary?

Why Do We Use Models?

Models let us do things that would be too complicated, too slow, or too expensive to attempt in the real world. With the models being developed for Long Island Sound, we will be able to simulate how various management actions would affect the hypoxia problem.

For example, upgrading sewage treatment plants to remove nitrogen through advanced treatment could cost as much as $5 for each gallon of effluent the plant discharges daily.* Cost to upgrade a single plant discharging 200 million gallons a day could thus be $1 billion. If we were to require upgrading with the information available to us now, we could conceivably spend a lot of money without knowing whether hypoxia would be reduced.

A computer model, on the other hand, once fully developed and calibrated, can quickly simulate the same situation, varying chosen conditions to predict the outcome. Even though models are themselves time-consuming and costly to develop, a well-developed model is the best tool we have for evaluating options for managing Long Island Sound. The model will allow us to target funds toward reducing sources that will have the greatest effect. The cost of our model will be less than 1 percent of the potential implementation costs.

*Newer, less costly technologies are being examined by the LISS. If their promise is fulfilled, upgrading sewage treatment plants may be less expensive than originally thought.

Since 1987, researchers have been collecting data (see box below) to feed into the models. Some of the data will be used to develop the models and some to evaluate their performance. Data collection will continue until October 1989. The next steps are adjusting the models so they fit Long Island Sound and then getting them to run together. The final step is to compare predictions generated by the models with field data gathered from Long Island Sound. This comparison tests the reliability of the models in describing oxygen dynamics in the Sound. In 1990 the models will be used to help develop management strategies and test their results. This information will be incorporated into the management plan.

What Kinds of Data Are Being Collected for the Models?

Water Quality Measurements

Salinity, temperature, dissolved oxygen, pH, and light penetration are measured in the field.

Carbon, phosphorus, nitrogen, silica, chlorophyll-a, hydrogen sulfide, turbidity, alkalinity, and biochemical oxygen demand are determined in the laboratory from field samples.

Phytoplankton samples are being analyzed in the laboratory.

Water Column Rate Measurements

The production and use of oxygen by algal photosynthesis and respiration was measured weekly.

Sediment Measurements

The oxygen demand exerted by the sediments and fluxes of nutrients in and out of the sediments was measured at various stations on three dates.

Waste Inputs

Nutrients and biochemical oxygen demand in river flows and major direct discharges (e.g., sewage treatment plants) are measured every other week.

Hydrodynamic Measurements

Water movements (with NOAA's RADS and SUNY's conventional current meters), meteorology, water levels, temperature, and conductivity are measured at various stations.

What Factors Contribute to Hypoxia?

Preliminary modeling activities suggest that nitrogen is the nutrient that limits the growth of phytoplankton in Long Island Sound. This means that, of all the substances required by the plants for growth, nitrogen is used up first. When the supply of nitrogen is exhausted, phytoplankton stop reproducing and the explosive growth known as a bloom ends. As we have already seen, death and bacterial decomposition of phytoplankton cells deplete oxygen and can result in hypoxia.

Because nitrogen appears to be the limiting nutrient in the Sound, control of nitrogen sources is likely to discourage excessive growth of phytoplankton and reduce the occurrence of hypoxia. Sewage treatment plants, land runoff by way of rivers, and atmospheric deposition are responsible for most of the nitrogen added to Long Island Sound (Figure 2). In order to determine the relative contributions of the three factors, the states of Connecticut and New York have been monitoring sources around the Sound.

Sewage Treatment Plants

Preliminary estimates suggest that sewage treatment plants contribute at least 37 percent of the water-borne total nitrogen in Long Island Sound. This value is based on engineering estimates of the levels of nitrogen in a typical plant effluent. To get more accurate information on how much nitrogen is actually coming from sewage treatment plants in coastal counties, the New York State Department of Environmental Conservation and the Connecticut Department of Environmental Protection began monitoring effluent at selected plants in their respective states in April 1988. Monitoring will continue through September 1989.

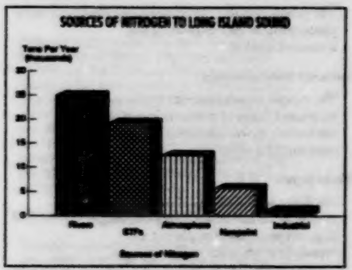


Figure 2. Preliminary estimates show that rivers, sewage treatment plants, and the atmosphere are the major sources of nitrogen to LIS. The river category includes nitrogen from all sources, both point and nonpoint, that drain into the Sound's tributaries; the nonpoint category includes all nonpoint-source nitrogen that enters the Sound directly instead of being carried by a river. (From Paul Stacey, Connecticut Department of Environmental Protection.)

At the Connecticut plants, the mean concentration was about 18 milligrams of total nitrogen per liter (mg/L) of effluent. New York City facilities averaged 13.1 mg/L and the remaining New York State plants averaged 15.4 mg/L. The engineering estimate used for the initial calculations was 11 mg/L. Thus more nitrogen may be entering the Sound from sewage treatment plants than was previously believed. Clearly, the sampling is giving us valuable information for development of an accurate water quality model.

Rivers

In an early study sponsored by the LISS, riverine sources, primarily the Connecticut River, were estimated to deliver nearly half the nitrogen load from the Connecticut counties bordering the Sound. This estimate reflected all the point sources (for example, sewage treatment plants and industrial discharges) and non-point sources (particularly runoff of stormwater from urban and agricultural land) adding to the natural load of the river. The value was based mostly on estimates, so to get a better understanding of how much nitrogen is brought in by rivers, the Connecticut Department of Environmental Protection is working with the U.S. Geological Survey on a river monitoring program. Samples are taken twice monthly from 11 key locations around the state and analyzed for nutrients. We are concentrating on Connecticut because no major freshwater rivers enter the Sound from New York State.

Samples taken during the 1988 monitoring initiative illustrate how much the nitrogen content of different rivers can vary (Figure 3). On average, the Connecticut River contributes more than 70 percent of the freshwater flow to Long Island Sound. Although the Quinnipiac River contributes only about 2 percent of the freshwater flow, the location of this river nearer to the hypoxic zone may make its smaller load more significant to the hypoxia problem.

The 1988 monitoring results also show how variable one river can be depending on season and amount of discharge from streams (Figure 4). Because hypoxia is usually a seasonal problem, occurring primarily in late summer, the time of year that nitrogen is being loaded into the Sound may be an important variable in understanding and managing hypoxia.

Only through refined estimates of nitrogen loading, supplied by monitoring, can realistic values be incorporated into the model. This is the key to producing definitive evaluations of how much we need to reduce nitrogen, from what sources, and in what areas.

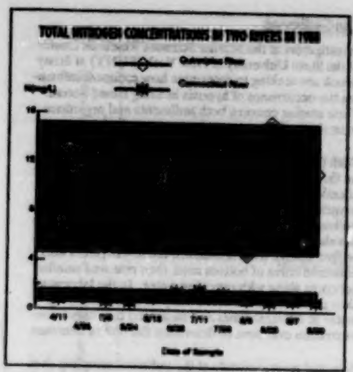


Figure 3. Total nitrogen concentrations in the Quinnipiac River ranged from 4.3 to 15 mg/L between April and September at the North Haven sampling station. During the same period, nitrogen in the Connecticut River at East Haddam ranged from 0.8 to 1.76mg/L. Although the concentration of the nitrogen in the Quinnipiac River is several times higher than the concentration in the Connecticut River, the discharge of the Connecticut is usually 100 times greater. (From Paul Stacey, Connecticut Department of Environmental Protection.)

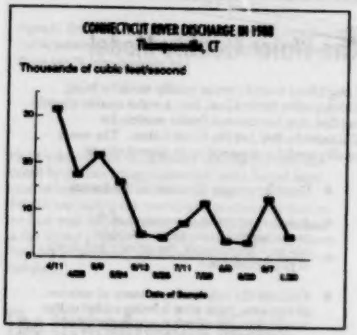


Figure 4. Seasonally, river discharges vary widely, from high flows in the spring to low flows in the late summer. Because the concentrations of nitrogen in the waters of a river are fairly uniform, the total contribution varies seasonally because of the changes in the amount of water the river discharges to the Sound. (From Paul Stacey, Connecticut Department of Environmental Protection.)

Where Is Oxygen Taken Out of the Water?

We know that the decomposition of phytoplankton is one way that oxygen dissolved in Long Island Sound waters is used up. However, massive blooms of phytoplankton are unusual events. We also need to know more about other mechanisms that use excessive oxygen. In general, there are two distinct areas in which oxygen can be consumed – in the water and in the sediments on the bottom of the Sound.

The Water Column

Scientists at the University of Connecticut (UConn) Marine Sciences Institute have been working to determine how organisms living in the water column (that is, distributed through the water from the surface to the bottom) affect the supply of oxygen in bottom waters. To do this, they collected water from four or five depths and put it in bottles, which they suspended back in the Sound for 8 hours at the depths from which the water was originally taken. At each depth, half the samples were in clear bottles and half in opaque bottles. The clear containers (light bottles) represent the amount of oxygen produced during the day by photosynthesis less the amount consumed during the ongoing processes of decay and respiration. The opaque containers (dark bottles) represent changes that would occur at night, or the consumption of oxygen by respiration and decay, because photosynthesis cannot occur in the dark. Measurements were carried out from April through September.

The results of these experiments showed that, when the water column was divided into layers that prevent mixing between water at the surface and at the bottom, the greatest amount of oxygen was removed near the boundary between the two layers. This boundary is known as the *pycnocline*. Waters near the bottom showed surprisingly little oxygen change. This pattern suggests that, at least during the summer, most of the phytoplankton produced at the surface decays well before it reaches the lower levels of the water column or the sediments. The results also suggest that summertime respiration by organisms in the water column, including bacteria, may utilize more of the available oxygen than previously thought. Thus, during the summer, water column respiration appears to be very important in maintaining hypoxic conditions. As shown in Figure 5, this water column mechanism has been added to our understanding of how hypoxia develops and is maintained.

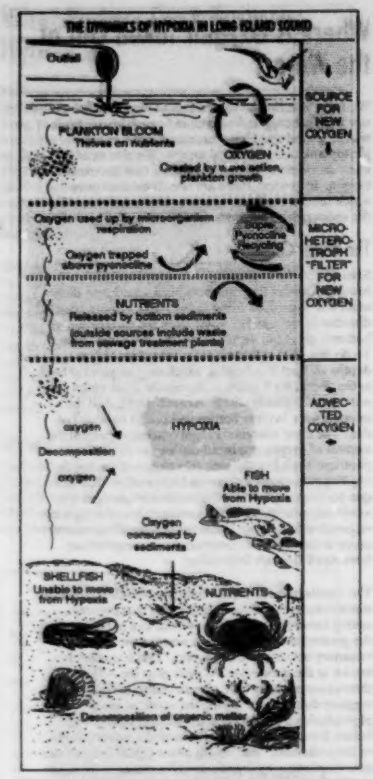

THE DYNAMICS OF HYPOXIA IN LONG ISLAND SOUND
Outfall
PLANKTON BLOOM
Thrives on nutrients
OXYGEN
Created by wave action, plankton growth
SOURCE FOR NEW OXYGEN
Oxygen used up by microorganism respiration
Super-Pycnocline Recycling
Oxygen trapped above pycnocline
MICRO-HETERO-TROPH "FILTER" FOR NEW OXYGEN
NUTRIENTS
Released by bottom sediments
(outside sources include waste from sewage treatment plants)
ADVEC-TED OXYGEN
oxygen
HYPOXIA
Decomposition
oxygen
FISH
Able to move from Hypoxia
Oxygen consumed by sediments
SHELLFISH
Unable to move from Hypoxia
NUTRIENTS
Decomposition of organic matter

Figure 5. Solar heating of the surface results in a thermocline that controls summertime stratification of the water column and promotes the concentration of bacterioplankton in the density gradient associated with the interface between upper and lower water layers. These bacterioplankton, in the course of consuming sinking algae and dissolved organic matter, also consume oxygen, creating a high demand for oxygen at the interface. Their activity also intercepts new oxygen supplied from surface production and atmospheric mixing. Thus they enhance the effect of the heat-controlled pycnocline in helping develop and maintain summertime hypoxia in bottom waters. (From Barbara Welsh, University of Connecticut, and Kirk Cochran, State University of New York.)

The Sediment

Investigators at the Marine Sciences Research Center of the State University of New York (SUNY) at Stony Brook are seeking to determine how sediment influences the occurrence of hypoxia in Long Island Sound. Their studies concern both sediments and organisms from the seafloor.

With the help of bacteria and animals that live in and on the seafloor, organic matter in sediment reacts chemically with oxygen, thus reducing the available oxygen supply in the water (see Figure 5). Samples of bottom dwelling fauna were collected to help evaluate the changes in oxygen concentration. To measure oxygen uptake from sediments, the investigators also collected cores of bottom mud, then removed smaller subcores along with overlying water. In the laboratory they periodically extracted samples of the overlying water at different times and measured the oxygen concentration over time to determine the rate of decrease.

Seasonal measurements at the sediment sampling sites have shown that oxygen uptake by sediments is directly related to the amount of organic matter in the sediment and inversely related to the oxygen content of the overlying water. Because the sediments with the highest content of organic matter are found in shallower water, including the western Sound where hypoxia is usually more serious, oxygen uptake is usually highest in these areas. The results suggest that the sediments may be quite important in maintaining hypoxic conditions in the overlying water column.

The Water Quality Model

Long Island Sound's water quality model is being developed by HydroQual, Inc., a water quality consulting firm that has created similar models for Chesapeake Bay and the Great Lakes. The water quality model is designed to do several things:

- Describe oxygen dynamics in the Sound.
- Assess the relative importance of the processes that generate and deplete oxygen – for example, the growth and death of phytoplankton.
- Evaluate the relative importance of sources of nutrients, both what is being added to the Sound now and what has accumulated in the sediments.
- Test alternative scenarios to determine how reducing certain inputs of nutrients to the Sound will affect water quality.

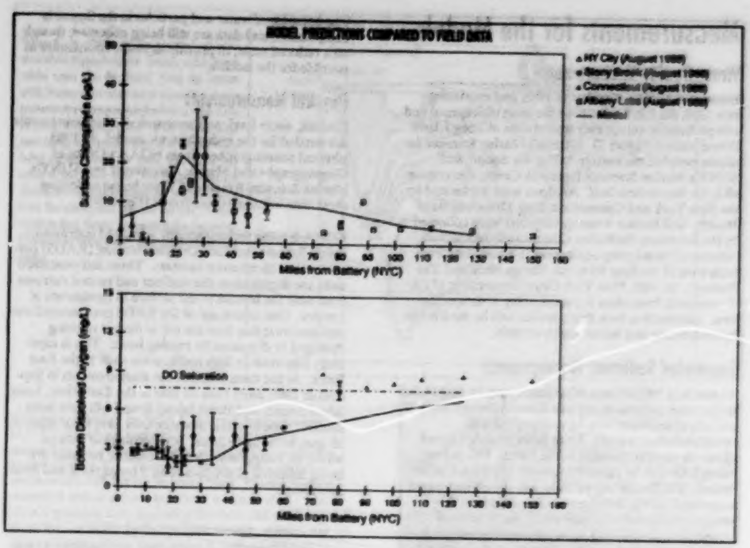


Figure 6. Preliminary runs of the water quality model compared fairly well with data collected last summer in the Sound. The solid line is the model's prediction, and the points represent actual data collected in August from the Sound. As the model is refined, the fit between the model and data from the Sound will improve. (From John St. John, HydroQual, Inc.)

The model will not be complete until all the data collected by studies being conducted in the Sound have been incorporated. Nevertheless, HydroQual engineers are testing the model with preliminary data to see how well its predictions match existing conditions in the Sound (Figure 6). With a few exceptions, results from the preliminary model compare favorably with actual data.

The Hydrodynamic Model

The Office of Oceanography and Marine Assessment of the National Oceanic and Atmospheric Administration (NOAA) is working on a model that, when completed and fully tested, will simulate the movement of water within the Sound for a variety of situations. It will reproduce the effects of tide, wind, atmospheric pressure, and freshwater discharge from rivers. Currents simulated by this model will be used to drive the water quality model being developed by HydroQual.

In 1988, NOAA concentrated on adapting an existing model to Long Island Sound, and on developing a system to display and analyze the large quantity of simulation data produced by each run of the model. Data produced by the model will be compared with field measurements to assess the model's ability to recreate the distribution of important physical conditions in the Sound.

The hydrodynamic modeling project is being conducted in close cooperation with HydroQual. Coupling the results of the hydrodynamic model and the water quality model is a major focus for 1989.

Measurements for the Models

Water Quality Measurements

Between April and October of 1988, and continuing into 1989, the LISS sponsored the most widespread and comprehensive survey ever undertaken of Long Island Sound waters (Figure 7). UConn's Marine Sciences Institute sampled the eastern half of the Sound, and SUNY's Marine Sciences Research Center was responsible for the western half. Analyses were performed by the New York and Connecticut State Departments of Health. Still further water quality data were collected by the Interstate Sanitation Commission, which used automated monitoring equipment to amass data from both ends of the East River (at Throgs Neck and The Battery). In 1989, New York City's Department of Environmental Protection is participating in data collection. Information from these studies will be used in the hydrodynamic and water quality models.

Suspended Sediment Measurements

As much as 340,000 tons of sediment may be suspended in the water column at any one time. Although any one particle of sediment may be redeposited and resuspended repeatedly, it can be expected to spend about six months traveling in the water. This is long enough for it to be carried to almost any corner of the Sound. The fate of any particle, and the contaminants associated with it, is influenced by patterns of flow whose signature can be seen in the distribution of temperature and salinity in the Sound (Figure 8). A physical oceanographer could interpret the pattern to show different streams of Sound water flowing both down the Sound's axis near the bottom and along each shore.

The behavior of water and particles in the Sound is complicated, and data are still being collected, though on a reduced scale, to provide as much information as possible for the models.

Physical Measurements

Current, water level, and meteorological measurements are needed for the hydrodynamic model. In 1988, physical oceanographers from NOAA's Office of Oceanography and Marine Assessment and SUNY's Marine Sciences Research Center began collecting these data in Long Island Sound (Figure 9).

NOAA is using technologically advanced instruments called Remote Acoustic Doppler Sensing (RADS) current meters to measure currents. These self-contained units are deployed on the seafloor and record currents from near the bottom to the surface in increments of 1 meter. One advantage of the RADS over moored current meters is that they are not in danger of being damaged or displaced by passing boats. This is especially important in high traffic areas such as the East River. At the completion of the measurements in September 1989, more than 20 sites in the East River, Long Island Sound, and Block Island Sound will have been studied. Observations of water level have been made at 16 sites in the same areas. Meteorological data on winds, air temperature, and barometric pressure are being collected at two locations, Throgs Neck and Stratford Shoal.

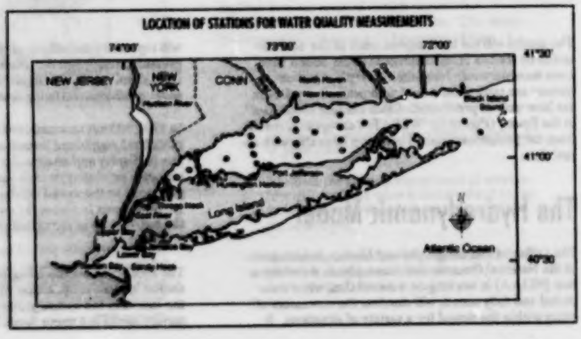
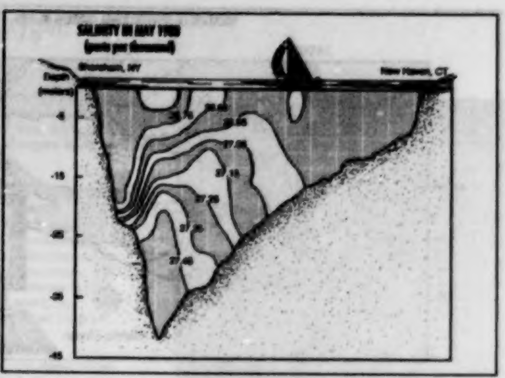


Figure 7. Stations in the eastern and western Sound were sampled for a variety of water quality measurements. (From John St. John, HydroQual, Inc.)

Figure 8. In addition to the expected estuarine circulation throughout the Sound, which brings saltier water into the Sound along the bottom while fresher water flows out at the surface, strong patterns also appear across the Sound from north to south. A ridgelike core of saltier water is often seen along the Sound's axis, with fresher water being carried along the shore both north and south of this saline core. This figure shows the distribution of salinity across the central Sound, from Shoreham, New York (on the left), 17 miles north to New Haven, Connecticut (on the right). (From Henry Bokuniewicz, State University of New York.)



The data collected by NOAA are supplemented by SUNY's data from conventional current meters moored in the water column at six transects across the Sound (Figure 10). This will provide information on north-south differences in water flow. Transects were occupied one at a time, for about a month each. The SUNY group is now analyzing the data and readying them for use in the hydrodynamic model. Additional data on conductivity, temperature, and salinity collected by SUNY, the Interstate Sanitation Commission, and the University of Connecticut are also needed to calibrate and validate the model (see box next page).

Physical oceanographers have analyzed data from 1988 RADS current meter stations in western Long Island Sound and at the eastern boundaries in Plum Gut and The Race. This information is important in understanding the transport of materials and pollutants in and out of the Sound.

Phytoplankton Measurements

Nassau County Department of Health scientists have been seeking to determine the composition of the various components of the phytoplankton community in the waters of Long Island Sound. This information is critically important to the water quality model being used to assess hypoxia. Phytoplankton have several different functions in the Long Island Sound environment. First, as primary producers, they are the base of the food web in the Sound. Second, they contribute to both oxygen generation (through photosynthesis) and oxygen consumption (through respiration in living phytoplankton cells and through the decomposition of those cells after death).

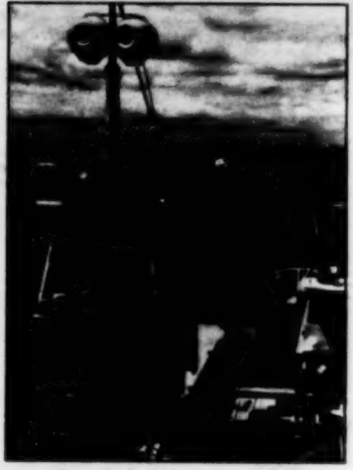


Figure 9. Ship support for the measurement project has been provided by the NOAA ships Ferrel and Delaware II, and the U.S. Coast Guard's buoy tender Redwood. Here a RADS current meter is being deployed by the Ferrel. (Photograph courtesy of the National Oceanic and Atmospheric Administration.)

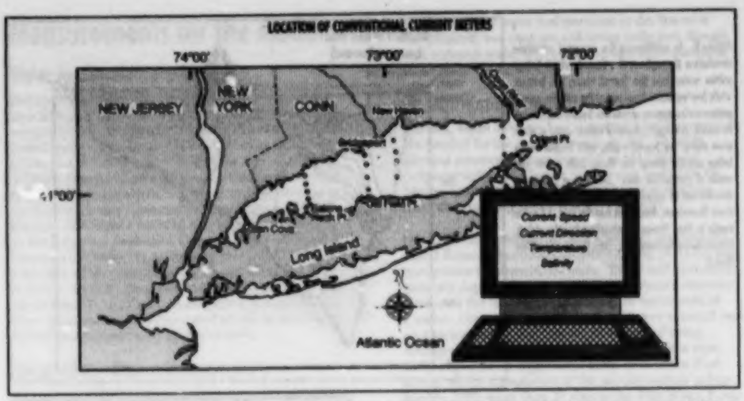
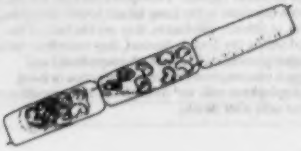


Figure 10. Current meters were placed on these six transects across the Sound. The instruments recorded current speed and direction, temperature, and salinity on magnetic tape for later analysis. (From Mario Vieira, State University of New York.)

More About Models

A mathematical model must mimic nature. In this case, the completed, coupled model must accurately reproduce the circulation and water quality in the Sound. This involves calibration and validation of the model. Think of the mathematical model as a *black box* with a certain number of *dials* the operator can turn to control the output. When the model of the Sound is first run, we calibrate it by adjusting the imaginary dials so that the results (currents, salinities, oxygen, nutrients, phytoplankton populations, etc.) agree with measurements taken in the field. The position of the dials is then locked and the model is run again, under different conditions. Once more we compare the results with measurements taken under these new conditions; they should be similar, or at most require a minor adjustment. In this manner we validate the model.

Investigators are identifying and quantifying four categories of phytoplankton: diatoms, dinoflagellates, blue-green algae (cyanobacteria), and other types. This information will help to show the relative dominance and importance of each of these major groups of primary producers during various seasons. Samples for this study were taken near the surface on a weekly schedule at several sites from April through October. In the laboratory, investigators microscopically analyze a known fraction of sample, calculating the number of cells per milliliter of water and, where possible, identifying the cells to genus and species. In addition, the cell dimensions are averaged to assist in determining biomass, or amount of phytoplankton material, in the sample. When compiled, this information will provide the most comprehensive picture available to date of the phytoplankton community in Long Island Sound.



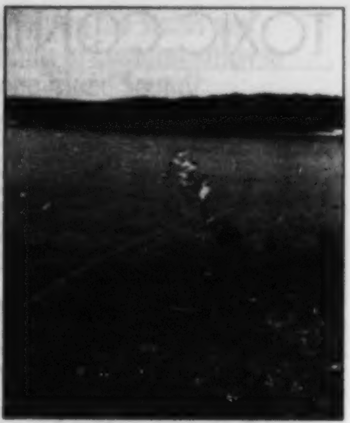
How Does Lack of Oxygen Affect Marine Life?

Laboratory research is continuing to identify the minimum amount of dissolved oxygen required by marine life in Long Island Sound. Results of these studies will be used to develop goals for dissolved oxygen levels in Long Island Sound.

Studies by researchers from the U.S. Environmental Protection Agency's Environmental Research Laboratory in Narragansett, Rhode Island, and from Science Applications International Corporation, also in Narragansett, are testing how some species respond to two stressful situations that can develop in nature. The first situation is the brief occurrence of extremely low levels of oxygen (acute stress); the second is the prolonged occurrence of somewhat reduced levels of oxygen (chronic stress).

Tests of acute stress show that embryonic stages of fish become more sensitive to low dissolved oxygen as they approach hatching. Also sensitive are several crustacean species that serve as food for fish. Tests of chronic stress have been completed for the Atlantic silverside, a small fish that is important in Long Island Sound as a food for other fish that are harvested commercially. When fertilized eggs were exposed to different concentrations of oxygen, the development of the embryos was not impaired, nor was there evidence that the growth of the larvae was affected after hatching. However, as the test continued, at concentrations below 3.9 milligrams of dissolved oxygen per liter of seawater, the fish began to die.

Additional tests will be conducted with other species to accumulate enough information to estimate how much oxygen is necessary to avoid catastrophic fish kills and to avoid chronic stress to the marine life of the Sound from lowered oxygen levels. The real challenge will come in trying to understand the effects of extremely dynamic changes in dissolved oxygen levels. On a daily basis, levels may fluctuate widely, particularly in areas close to shore. We need to discover how organisms respond to these changes.



Photograph by D. Nick Roark.

TOXIC CONTAMINATION

Another of Long Island Sound's pressing environmental problems is contamination from chemicals such as metals, pesticides, products used in various industries, and compounds derived from petroleum or from processes such as burning. We are concerned about the presence of these chemicals in the water and sediment because, in sufficiently high concentrations, they can be harmful to marine animals and to humans who eat seafood from the Sound.

The first step taken by the Long Island Sound Study was to identify and organize the facts already known about toxic contamination in the Sound (see box below). The next step was to sponsor studies to gather additional information to fill in the picture of the extent of contamination and its sources (see box on next page). These studies continued in 1988. The final steps, which have already begun, are to identify strategies for pollution abatement and to put them into effect, along with a program to monitor how well the management controls are working.

A Review of Some Historical Information About Long Island Sound

At the outset of the Long Island Sound Study, several agencies compiled existing information on the contamination of water, fish, and sediments in the Sound. The objective of this compilation was to create a computerized database of information and use it to identify contaminants of concern, determine which species are most contaminated, and describe general spatial and temporal patterns of contamination.

The Interstate Sanitation Commission (ISC) looked at water quality studies conducted by its own staff and by the New York City Department of Environmental Protection, the Connecticut Department of Environmental Protection, and the New York counties of Nassau, Suffolk, and Westchester. The ISC was able to synthesize results from six sets of data on heavy metals and organic chemicals. These data showed spatial trends in the concentration of metals in the water column. For example, the amounts of cadmium and lead decreased from west to east across the Sound. The amount of copper was generally the same in the east and west, except for about one-quarter of the western samples, which had high concentrations of the metal. The copper, which is thought to be leaching from household plumbing, could enter the water from the many sewage treatment plants in the western part of the Sound. The ISC found that data for organic chemicals such as pesticides and PCBs were too limited to be useful for identifying trends. As a result of the ISC synthesis, the LISS recommended standardized sampling methods so that results collected by different agencies could be compared in the future.

The New York State Department of Environmental Conservation and the Connecticut Department of Environmental Protection examined data on contaminants in fish and shellfish that live in Long Island Sound. Because consumption of contaminated seafood is a major concern, concentrations of toxic chemicals in animals were compared to the levels the U.S. Food and Drug Administration uses to determine when to ban seafood from interstate transportation. The New York agency found indications that striped bass from the Sound had persistent levels of PCBs above the FDA Action Level of 2 parts per million. Pesticides in eels and lobsters from the Sound were generally well below the FDA Action Levels. Concentrations of PCBs, however, were elevated in eels from the western Sound and also in an organ called the hepatopancreas (also known as the *tomalley*) of lobsters from all areas of the Sound. An east-to-west trend of increasing PCB contamination was also noted. In 1989, the New York State Department of Health included eels in the general advisory suggesting that consumption be limited to one meal per week and recommended that the hepatopancreas of lobsters not be eaten. The Connecticut scientists analyzed data on pesticides and PCBs in blackfish (tautog), winter flounder, lobster, and oyster from Connecticut waters. These data were consistent with the New York results – concentrations were generally low except for elevated levels in lobster hepatopancreas.

Results of Some Earlier LISS Studies

After examining the data already available on conditions in Long Island Sound, the LISS sponsored new research to fill in gaps in the historical information. As part of this effort, the Connecticut Department of Environmental Protection and the New York State Department of Environmental Conservation monitored key fish and shellfish in the Sound. In 1986, they found that levels of some contaminants were higher than expected. Concentrations of cadmium and PCBs were particularly high in lobster hepatopancreas (tomalley). In 1987, levels of metals in winter flounder showed no trend and were very low in the edible portion of the fish. Lobster tail and claw meat was also very low in toxic chemicals, but levels of cadmium and PCBs in the lobster tomalley reaffirmed the 1986 results. Although there was some variability, the new data did not suggest any geographic trends.

The LISS also sponsored studies to understand how contaminants enter and move around in the Sound. Scientists from SUNY and UConn worked at quantifying the sources and distribution of contaminated sediment. In related studies, researchers from EPA's Environmental Research Laboratory in Rhode Island and from Science Applications International Corporation performed tests to see if sediment from Bridgeport and New Haven harbors was toxic to test species. Results indicated that recently deposited sediment in the two harbors is not accumulating contaminants at concentrations harmful to marine animals.

The atmosphere was also evaluated as a source of contamination. A study conducted at SUNY Stony Brook suggested that deposition from the atmosphere is an important source of copper and lead for the sediments in central Long Island Sound.

What Are the Status and Trends of Contamination in Long Island Sound?

NOAA's National Status and Trends (NS&T) Program has been collecting data on contaminant levels in Long Island Sound since 1984 (see box below). The program is based on the sentinel organism approach to assessing pollution. This approach takes advantage of the fact that bivalves such as mussels remain in one area and are known to accumulate substances from the water in which they live. The concentration of a contaminant found in the tissues of these animals is thus an indication of the condition of the surrounding water.

For three winters since 1985, scientists with the NS&T Program have collected mussels at nine sites in Long Island Sound. For two of those years, they also collected sediments. Information from these samples makes it possible to describe the status of contamination (that is, its spatial distribution). These three annual analyses do not, however, provide enough data to define clear trends (that is, to be sure what is happening over time).

A National Program for Pollution Assessment

NOAA's National Status and Trends Program annually monitors levels of chemical contaminants at 200 sites in coastal and estuarine areas of the United States, including Long Island Sound. These sites are selected to be as representative of average conditions as possible; that is, toxic *hot spots* are avoided. Bivalve shellfish, predominantly mussels, and sediments are collected to be analyzed for 17 metals, DDT and other pesticides, and two classes of compounds called polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs). PCBs are highly toxic chemicals that have been used for various industrial purposes, including the manufacture of electrical insulators. Although banned in the United States since the 1970s, these chemicals persist in the environment for long periods of time. PAHs, which were one of the first classes of compounds demonstrated to cause cancer in man, are formed by the incomplete burning of oil products, wood, and coal.

Where Are the Toxic Contaminants in the Sound?

Before 1988, the LISS had already identified a general tendency for contaminant levels to be higher west of the Hempstead Sill than elsewhere in Long Island Sound. For example, analysis of historical data showed that concentrations of some metals in Long Island Sound water increased from east to west and that PCB levels in eels and some lobster tissue displayed a similar trend. In fact, comparison with nationwide NS&T stations shows that samples from Throgs Neck are among the most contaminated in the United States.

Among the contaminants measured by the NS&T Program, four elements and four classes of organic compounds show average concentrations that, over the three years, differ among the nine Long Island Sound sites by at least a factor of 2. The elements are silver (Ag), chromium (Cr), mercury (Hg), and lead (Pb). The organic classes are polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and the pesticides DDT and chlordane. When the concentrations of these chemicals are compared to concentrations at Throgs Neck and a ratio is calculated, both mussels and sediment show a general western enhancement of contamination (Figure 11). Sediment comparisons are complicated by the fact that different areas have different types of sediment, and the size of the constituent particles affects the way that contamination accumulates in a site (see box below).

Sediment Size Affects Contamination

Sediment data in Figure 11 have been standardized to the fraction of sediment that was fine-grained. Sediment data for three sites, the Housatonic River, Port Jefferson, and New Haven, are not shown in the figure. Sediments at these sites were more than 80 percent sand, and such sediments usually appear relatively clean simply because the large size of the sediment grains prevents contaminants from accumulating on their surfaces. Finer sediments provide more surface area per unit volume for the attachment of contaminants.

It is important to note, however, that the sediment from the Housatonic River, even though it averaged 90 percent sand, had a mean concentration of PAHs that, on a national scale, would be among the highest concentrations observed – even for fine-grained sediment. This is an exception to the general observation that Hempstead Sill separates the highly contaminated part of Long Island Sound from the rest. The anomaly may be accounted for by the location of the site in the mouth of a major river.

How Does Contamination in Long Island Sound Change Over Time?

The amount of contaminants that mussels accumulate in their tissues changes with the conditions in the surrounding water. That is why mussels are often transplanted to special areas of study to gauge changes in water quality. Sediments, on the other hand, will not generally reveal short-term changes because sediments deposited at different times are mixed together on the seabed. Mixing is brought about by the action of bottom-dwelling animals such as polychaete worms; the action of tides, waves, and currents; and the effects of storms. Contaminant trends over time are thus best sought through mussel analyses.

One mean value for each of three years is not enough data to establish a valid relationship between contaminant and time. However, NOAA scientists have been able to preliminarily identify broad trends by using three criteria to simplify the analysis. First, contamination at a site must be sufficiently different over the three years to be detected by statistical tests. Second, the difference between the 1986 and 1988 concentrations must be at least twofold. Third, the change must be in a consistent direction; that is, the mean value for 1987 must fall between the means for 1986 and 1988.

In 14 out of 127 possible combinations of sites and contaminants (9 sites, 13 contaminants), those three conditions are fulfilled (Table 1). In 12 of the 14 cases, the preliminary trends show a decrease in contamination. These conclusions agree with the results of a study conducted by the Connecticut Department of Environmental Protection in 1985 and 1986. The agency found that, although oysters in Bridgeport Harbor and the Housatonic River had more metal in their tissues than expected, the concentrations were actually lower than in oysters collected from the same sites between 1972 and 1974.

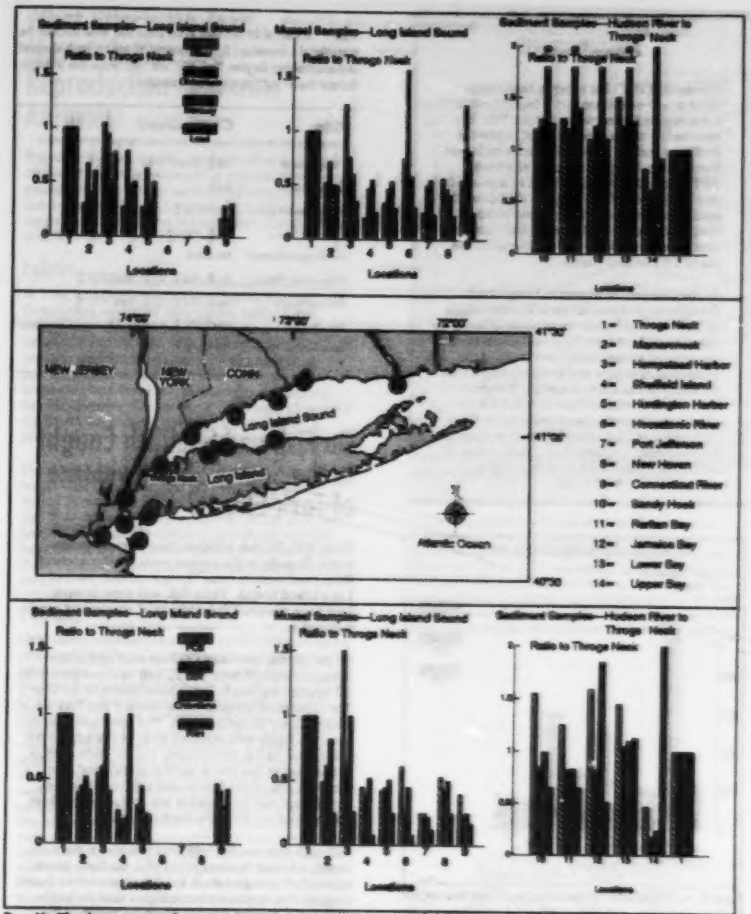


Figure 11. When the concentration of some metals (top) and organic compounds (bottom) at sites in Long Island Sound and the Hudson-Raritan Estuary are compared to concentrations at Throgs Neck and a ratio is calculated, both mussels and sediment show a general western enhancement of contamination. (From Tom O'Connor, National Oceanic and Atmospheric Administration.)

A Special Study on TBT

Tributyltin (TBT) has recently been recognized as a contaminant that is highly toxic to some marine life in coastal waters. TBT has been widely used in marine paint to prevent fouling organisms such as barnacles and algae from accumulating on the hulls of vessels. TBT is considered such a threat to marine life that in 1988 use of marine paint containing the antifoulant was severely restricted in the United States. Both New York and Connecticut have adopted regulations to control the use of TBT in their states.

In 1988, mussels at all sites in Long Island Sound were analyzed for their concentrations of TBT and its breakdown products (Figure 12). The highest value (550 nanograms of tin per gram of mussel tissue) was found at the Mamaroneck station and probably reflects the proximity of the site to a marina. Shellfish (mussels and oysters) from 45 other sites in the country have also been analyzed, and concentrations at 12 sites are higher than those at Mamaroneck. Concentrations in the range of 1000 to 4000 ng/g of tin were found near marinas on the West Coast.

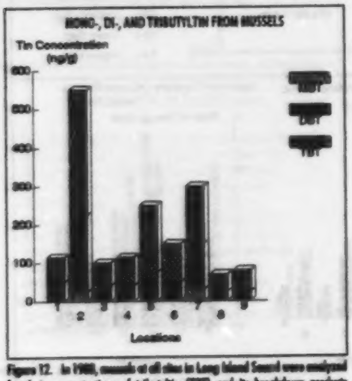


Figure 12. In 1988, mussels at all sites in Long Island Sound were analyzed for their concentrations of tributyltin (TBT) and its breakdown products monobutyltin (MBT) and dibutyltin (DBT). Locations are keyed to map in Figure 11. (From Tom O'Connor, National Oceanic and Atmospheric Administration.)

Table 1. At seven of the nine Long Island Sound sites, NOAA identified the suggestion of a decreasing (⇓) or increasing (⇑) trend in levels of mussel contamination over the years 1986, 1987, and 1988. (From Tom O'Connor, National Oceanic and Atmospheric Administration.)

Site	Contaminant
Throgs Neck	Cd ⇓, total PAH ⇓
Mamaroneck	Ag ⇓
Hempstead Harbor	total PCB ⇓
Sheffield Island	Ag ⇓, total PCB ⇓, total Chlordane ⇓
Huntington Harbor	No trend
Housatonic River	Ag ⇓, Cd ⇓, Cr ⇓, total PAH ⇑
Port Jefferson	Ag ⇓, Cd ⇓, Cr ⇓, total PAH ⇑
New Haven	total DDT ⇓, total PAH ⇑, total Chlordane ⇓
Connecticut River	No trend

Do Fish and Shellfish Caught in the Sound Show Evidence of Toxic Effects?

Since 1984, NOAA scientists have been collecting winter flounder in the eastern (near the Connecticut River) and western (near Hempstead Sill) parts of Long Island Sound. These fish, and some mussels, have been examined for evidence of response to contamination.

Of the 180 fish examined (30 from each end of the Sound for each of three years), only one specimen from the western site was found to have tumors of the liver. The connection between contamination and liver abnormalities is not straightforward. The same sampling intensity in highly contaminated areas of Boston Harbor has yielded 14 fish with tumors. On the other hand, a site in Raritan Bay that is more contaminated than western Long Island Sound, and a site in Great Bay, New Jersey, that is somewhat less contaminated, have both yielded two fish with these conditions.

Although only one fish with liver tumors has been collected, evidence of damage to DNA, the basic genetic material of an organism, in fish from the western Sound suggests that contamination is higher than desirable. Such DNA damage may not affect the health of the animal, but is considered a necessary prelude to the kind of abnormal cell growth that causes tumors.

What Effects Do Toxic Materials Have on Reproduction in Marine Animals?

Reproductive success of a species is often a clear indicator of the future status of the population of that organism. NOAA's National Marine Fisheries Service Laboratory in Milford, Connecticut, has been evaluating reproductive success of lobster and flounder from several areas of Long Island Sound.

Lobster

In 1988, scientists collected egg-bearing lobsters from Connecticut waters off New Haven, Milford, and Bridgeport. This brood stock was brought into the laboratory and the eggs were hatched and cultured. Because young lobsters are cannibalistic, each larval or juvenile animal was raised in its own container. Reproductive success was measured by monitoring hatching success, the number of days required to reach the fourth larval stage, and growth and survival of juvenile (post-larval) lobsters up to 180 days in age.

Hatching success of lobsters from all three sites was better than 95 percent, and the number of days required to reach the fourth larval stage was a very normal 15 to 20 days. However, during the 180 days that juvenile lobsters were cultured, growth and survival were lowest in New Haven animals, intermediate in those from Bridgeport, and highest in those from Milford.

Flounder

Over three reproductive seasons (1986-1988), embryos of Long Island Sound winter flounder from six sites were tested. These collection sites represented a gradient from inshore to offshore in Long Island Sound (Figure 13). Embryos of fish from the deepest and presumably the least contaminated waters sampled (off Shoreham, New York) consistently had the best survival and most normal development. Embryos from the shallowest, near-shore, waters sampled (New Haven Harbor) had the highest mortality and gross abnormality. Results for embryos from all other sites sampled in the Sound fell between those for fish from Shoreham and New Haven Harbor. The degree of early reproductive success appears to correspond to an inshore-offshore gradient of pollutants, rather than an east-west gradient. In both lobster and flounder, New Haven can be singled out as the area in which reproductive success of the animals tested was lowest.

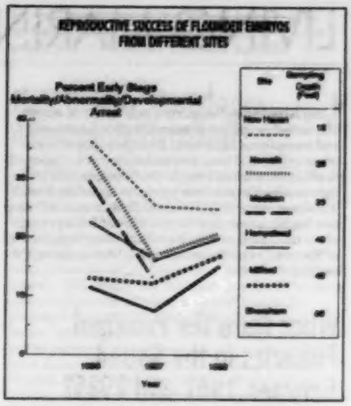


Figure 13. Over three reproductive seasons (1986-1988), embryos of Long Island Sound winter flounder collected from six sites representing a gradient from inshore to offshore in Long Island Sound were tested. (From Anthony Calabrese, National Oceanic and Atmospheric Administration.)

Embryo mortality and gross abnormality do not increase much as development progresses; even hatching failure is often not much greater. Therefore, the values shown in Figure 13 are reasonably good estimates of total mortality, excluding predation, for the early life stages of fish. In nature, reproduction may be affected more than estimated here if flounder from populations sampled in deeper waters come much further inshore to spawn.

LIVING MARINE RESOURCES

Long Island Sound supports a rich variety of marine life, including species of interest both to commercial and recreational fishermen. Problems such as inadequate oxygen and toxic contamination can be expected to affect the animals living in the Sound, and thus the lives and livelihood of many people around the Sound. The Connecticut Department of Environmental Protection has been assessing the condition of fishery resources in the Sound, and the New York State Department of Environmental Conservation has been assessing the shellfish resources.

What Were the Principal Fisheries in the Sound Between 1961 and 1985?

The major thrust of this review of fishery statistics was to compare today's fisheries with those that existed before the implementation of the Clean Water Act. Unfortunately, the lack of reliable information about the condition of the fishery prior to the mid-1970s has made this goal impossible to achieve with any confidence. What can be established is that there have been some significant local improvements in water quality and that the magnitude of the Sound's principal fisheries in the 1980s far surpasses that of the previous decade.

Although the increase in finfish landings has almost certainly resulted from more intensive fishing activity, landings of oysters and hard clams have also increased since the mid-70s. This is mainly due to increased cultivation and programs for moving shellfish from spawning beds to open water for maturation. As a result, possible trends in natural resource productivity are being masked as a result of improved aquaculture practices. Lobsters taken with pots or traps represent the third major fishery of the Sound and may provide the most accurate representation of increasing fishery trends.

The increased fishing effort in the Sound may have resulted from an increase in the abundance of the resource, stimulated, perhaps, by an improvement in water quality. Unfortunately, without definitive catch per unit effort data or survey indices, it is impossible to determine the abundance of the resource before the 1970s. Whether or not the recently observed increases have resulted in part from overall improvements in water quality is a subject for further speculation.

How Does the Bottom Trawl Catch from the Far Western Sound Compare to the Catch from the Central Basin?

The Connecticut Department of Environmental Protection, through a series of bottom trawl samplings taken monthly, April to November, is attempting to assess the relative abundance of finfish and lobster in the area west of Greenwich, as well as in the central part of the Sound. This sampling strategy was designed to examine differences in the species caught (species composition), as well as differences in size (size composition), for species in the two areas. Both species and size composition are subject to change when an area is avoided by species that are sensitive to low oxygen or toxic substances in the water column. A total of 32 trawl samples were taken each year in the western Sound from 1986 through 1987, and 28 trawls were made in 1988. Total catch of fish (Figure 14) declined 72 percent overall, from 1986 to 1987. A small increase was seen from 1987 to 1988, mostly due to a late summer influx of scup (porgy) and bluefish, and an increase in local stocks of windowpane flounder and tautog.

These values were compared with the catch from four to five trawls per month taken in the central basin of the Sound during the same period and using the same methods. Central basin total catch in 1986 was similar to the catch in the west. In 1987, the central basin catch declined 34 percent overall, but the catch was double that seen in the west. The overall total catch in 1988 exceeded the 1986 figure and was again double the catch seen in the western Sound that year.

Species composition was similar between the two areas and among years: 28 to 34 species were taken in the west each year, with four species (bonito, hard tail, northern kingfish, and round herring) not seen in the central basin trawls. The central basin catch included 35 to 37 species each year.

In 1986, eight species with high mean catches per trawl were compared for statistical differences in abundance. The four species that live in open water (bluefish, butterfish, scup, weakfish) were equally abundant in both areas and, of the four bottom-dwelling species (tautog, lobster, windowpane and winter flounder), only lobster had a significantly lower abundance in the western area.

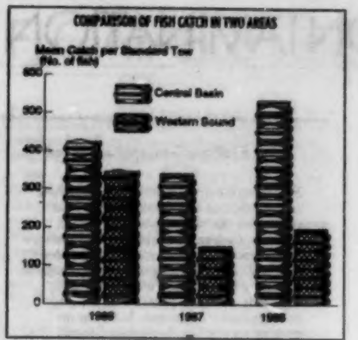


Figure 14. The mean catch per standard trawl for all species indicates that for all three years, more fish were caught in the central basin of the Sound than in the western Sound. (From Penelope Howell, Connecticut Department of Environmental Protection.)

In 1987 and 1988, the same eight species were compared. Both lobster and winter flounder were significantly less abundant in the western Sound. However, tautog and windowpane flounder stocks increased in this area, exceeding abundances in the central Sound. Late summer influxes of scup, butterfish, and bluefish were seen each year after large declines in all species in July and August. These influxes were large, though delayed until September-October in 1987-1988. Comparable sites in the central Sound did not experience such large seasonal fluctuations and, overall, maintained higher fish abundances and diversity. The period of greatest disparity between the two areas corresponded to the time of lowest oxygen levels and high water temperatures in the western Sound.

In 1988, lobster abundance declined dramatically in the western Sound while significantly increasing in the central basin. At the same time, the size of lobsters in the western population differed significantly from those in the central basin (Figure 15). Western catches had 17 percent fewer small lobsters, but 10 percent more intermediate-sized lobsters and 5 percent more lobsters of legal size. Lobsters taken in the western Sound had a median shell length of 71.8 mm (about 3 inches), whereas the median for central basin lobsters was 64.6 mm (about 2.7 inches). This pattern held for each year examined. These data corroborate the belief that areas of the central basin are abundant lobster nursery grounds, and it appears that young lobsters may be moving from these nursery grounds into the western area a year or two before they reach legal size.

How Is Fish Abundance Affected by Hypoxia?

In collaboration with the University of Connecticut, the Connecticut Department of Environmental Protection also investigated the relationship between fish abundance and levels of dissolved oxygen in the Sound during the hypoxic event in the summer of 1987. Preliminary results suggest that local populations of winter flounder avoided hypoxic areas in the western Sound. This species was the most sensitive of the three examined (lobster and two species of flounder). During August and September, abundances were below expected levels over the widest range of dissolved oxygen and habitat type. Lobster and windowpane flounder also appear to have been affected by hypoxia. These data, along with laboratory tolerance studies, will be used as input for the water quality model.

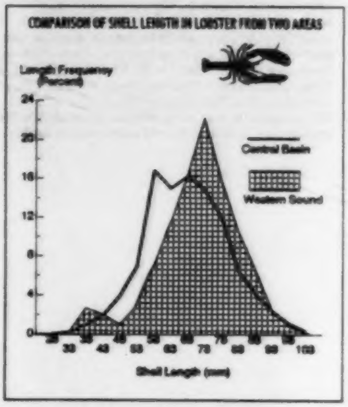


Figure 15. From 1986 to 1988, the length frequency of lobster caught in the western Sound was significantly different from that of animals from the central basin. (From Penelope Howell, Connecticut Department of Environmental Protection.)

PATHOGEN CONTAMINATION

Pathogens are microorganisms (for example, bacteria and viruses) that cause disease. Contamination of the waters of Long Island Sound by pathogens can close beaches to swimmers and put shellfish beds off limits to harvest of clams and oysters. The consequences of such closures can be both social (loss of recreational opportunities) and economic (lost harvest of commercial shellfish). Pathogens can enter the Sound from sources such as sewage, stormwater runoff, and wildlife. Sewage can come from sources including inadequate or malfunctioning municipal treatment plants, failing septic systems, and untreated boat discharge. In older sewer systems like many at the western end of Long Island Sound, combined sewer overflows, which carry both sanitary sewage and runoff from storm drains, are a common source of pathogens.

The Long Island Sound Study has recently formed a Working Group to investigate the issue of pathogen contamination of the Sound's waters. This group will characterize the conditions for beach and shellfish bed closures for both the Connecticut and New York shores of the Sound. They will study the standards and methods used to decide on the need for closure, the condition of beaches and shellfishing areas throughout the Sound, the sources of pathogens and how much contamination they contribute to the Sound, and the fate of these contaminants – what happens to them after they enter the water. The results will be incorporated into the management plan, along with recommendations for management actions to control contamination further.

How Is Pathogen Contamination Measured?

Pathogens are disease-producing organisms such as bacteria and viruses. They are the agents that can cause typhoid, dysentery, diarrhea, cholera, and hepatitis. Unfortunately, at present there is no quick, inexpensive test for determining the number of pathogenic organisms in water. Instead, water quality standards are based on tests that count so-called *indicator* organisms. Indicator organisms are coliform bacteria commonly found in the intestinal tract of humans and other warm-blooded animals. They are present in sewage and in water that has drained from land (runoff). Although these bacteria are themselves not harmful to humans, their presence usually indicates that other, pathogenic, organisms may also be present.

Standards based on coliform bacteria are acceptable as water quality tests because the results are more protective to human health rather than less. They may result in closure of a beach when no danger to the public really exists, but they are unlikely to fail to identify an actual threat to public health.

FLOATABLE DEBRIS

The problem of marine debris floating in coastal waters and washing up on beaches and shorelines has attracted considerable public attention in the last year or two. Last summer we were dismayed by reports of medical waste found on beaches all over the country. Although Long Island Sound has so far been spared the worst of these occurrences, there is no guarantee that this luck will continue. Furthermore, some of the Sound's shores do have a chronic, if mild, litter problem. The LISS Management Committee believes the issue should be addressed and has formed a Floatables Working Group for this purpose.

In Long Island Sound, the major sources of floating debris are combined sewer overflows, stormwater outfalls, storm runoff, and recreational beach and vessel litter. The Floatables Working Group has initiated the use of helicopter overflights of the Sound to identify the sources of floating debris more accurately. In the New York Bight, a very significant source is resuspension of debris from shorelines by monthly cycles of very high tides and by rainfall. The LISS Working Group is investigating the extent to which a similar process may be significant in the Sound. If it is significant, cleanup of the shoreline will become even more important.

The LISS management plan will address ways to markedly reduce the input to the Sound of materials that could wind up in the environment as floating debris. As an interim goal, the Working Group has recommended activities to curb one particular source of debris – littering on streets, beaches, and waterways – through public education. Long-term solutions, such as elimination of combined sewer overflows, will be costly and time-consuming.

Other interim goals are being developed. They may include a better assessment of how much debris is contributed by each identified source; design of a simple model to predict transport of materials under certain conditions of wind, current, and tide; and analysis of programs proposed by each state to abate the debris problem.

What Is Floatable Debris and Why Is It a Problem?

Floating marine debris can be made up of an assortment of waste materials. Plastic, metal, glass, paper, wood, and other substances can find their way into the water and be suspended there, or wash up on shore. Plastic articles are one of the biggest categories of floatable debris. The list includes bottles, bags, and six-pack rings; cups, plates, and utensils; fishing line, nets, floats, and ropes; diapers, tampon applicators, and condoms; and polystyrene particles of all sizes.

The presence of floatable debris in the marine environment is a danger to fish, birds, marine mammals and turtles. These animals can ingest floatable debris – mistaking it for items of their natural diet – and suffocate or starve as a result. They can also become fatally entangled in pieces of debris, especially six-pack rings and fishing line or nets.

Marine debris also interferes with our appreciation of the beauty of the environment and, in severe cases, causes beaches to be closed because of fear of risks to health. There is a strong possibility that beachgoers and other recreational users will avoid coastal areas because of fear and distaste. Still another possible undesirable effect is damage to vessels, through collision or fouling of propellers with floating waste. Ironically, most of the debris in Long Island Sound appears to originate from individual litterers, both on or near the water and in urban areas and highways from which water drains into the Sound.

ACTION PLANS

The Long Island Sound Study has sponsored projects to demonstrate the kinds of specific, concrete actions that can be taken to improve water quality in the Sound and to provide models for similar projects around the Sound and around the country. Action Plans are in progress for Mamaroneck Harbor in New York and Black Rock Harbor in Connecticut. Other projects will be undertaken in 1989.

Mamaroneck Harbor

The beaches in Mamaroneck Harbor are closed periodically during the summer due to contamination with fecal coliform bacteria. These are bacteria found in the intestines of animals, including man. Concentrations of bacteria are likely to be especially high after a rain, and the major causes of contamination are overflows from the sewer system and runoff of stormwater from the surrounding urban land. When flow is high due to heavy rain, sewers can overflow, bypassing municipal sewage treatment plants and discharging raw sewage to the receiving body of water. In the Mamaroneck Harbor area, this problem is being addressed through the negotiation of State Judicial Orders.

Preliminary analyses using stormwater and water quality models indicate a strong possibility that controls on stormwater runoff will also be necessary to address the problem of beach closures. In urban areas, water drained from the surface of the land can contain high concentrations of bacteria. These bacteria come from sources that include wastes from wild and domestic animals. Studies in Long Island, New York, and Buzzards Bay, Massachusetts, have shown that in areas with high populations of domestic animals, urban runoff can be a significant source of bacteria. Waterfowl such as ducks and geese can also contribute to contamination. The problem is intensified by the fact that a high percentage of urban land is covered with surfaces that do not absorb water (paved roads and parking lots, rooftops, etc.). Water from rain and snow thus does not have the chance to percolate through soil, which acts as a natural filter to remove many of the contaminants carried by the water.

The Mamaroneck Harbor Action Plan has the support of seven local governments in the drainage basin, the County of Westchester, the State of New York's Department of Environmental Conservation, and the Management Committee of the LISS. The project has four objectives:

1. Use water quality modeling techniques to relate urban stormwater discharges to receiving water quality and to establish how much stormwater runoff is acceptable.
2. Identify best management practices (BMPs) capable of achieving the allowable stormwater loadings.
3. Put selected BMPs into practice in the watershed and monitor their effectiveness.
4. Develop stormwater permits that incorporate BMPs to achieve acceptable water quality.

This project began in the fall of 1988. In 1989, the first three objectives will be fulfilled, with the demonstration BMP scheduled to be put into effect in the summer. In 1990, based on the results of the demonstration project and the adoption of national stormwater regulations, the state will develop stormwater permits that achieve the fourth objective. EPA has served as the lead agency coordinating this project. However, the state, county, and local governments will be responsible for implementing its recommendations.

Black Rock Harbor

In Connecticut's Black Rock Harbor, high concentrations of toxic contaminants are posing a threat to marine resources, including valuable oyster beds offshore of the mouth of the harbor and in nearby areas. Through the Black Rock Harbor Action Plan, we are seeking to reduce contamination in the area by better control of point sources of toxic materials. We will use these results as a model for measuring contamination effects on coastal embayments.

The project is being conducted by the Connecticut Department of Environmental Protection with technical support from the EPA Environmental Research Laboratory and its consultant, Science Applications International Corporation, in Narragansett, Rhode

Island. During the spring and summer of 1989, toxicity tests using marine organisms will be conducted on effluents from combined sewer overflows, industrial discharges, landfill leachate, and municipal wastewater discharges. Marine fish, invertebrates, and algae, in tests called bioassays, will be exposed to point and nonpoint wastewater being discharged to the harbor. The same tests will be conducted on harbor water from several locations and contaminated sediments from the harbor. The response of the organisms, for example, death or physiological impairment, will help identify the source of toxic contaminants to the system. Once the sources of risk to the resident organisms are identified, a program to manage the risk can be instituted. In Connecticut, many industrial and sewage treatment plants are already required to use bioassays for testing their effluents and then to eliminate toxicity indicated by the tests. These approaches should yield water quality benefits well beyond those achieved using existing methods based on numerical criteria. By fall, the discharges will have been compared to the toxicity of water in the harbor, and to some contaminants associated with harbor sediments.

Sources identified as toxic will be regulated through Connecticut's NPDES program, which issues permits to dischargers. The information gathered by the Black Rock Harbor project will be used to make changes in the conditions of the permits.

Photograph by Arthur Glowka.

PUBLIC OUTREACH

At the halfway point of the Long Island Sound Study, the importance of public involvement is greater than ever. The more the Study focuses on management of the Sound, the more we, as citizens, are likely to feel the effects in our daily lives. Management actions necessary to preserve the Sound may be as simple as persuading beachgoers to use litter receptacles to reduce floatable debris, or as complicated as upgrading sewage treatment plants to reduce hypoxia. In either case they demand an informed, supportive public. To meet this need, LISS public outreach, coordinated by the Sea Grant Programs of Connecticut and New York, continued to expand in 1988.

With the hiring of two Public Participation Coordinators, one for Connecticut in January and one for New York in July, the Public Outreach Program became a true bi-state cooperative effort. The program conducts a range of activities to exchange information between the Study and the public, press, and elected officials (Figure 16).

Public Education

During 1988, the scope of public education widened to include everything from intensive briefing of public officials to use of the mass media to inform the public about the LISS. Written materials continued to be a major part of the education campaign. The Public Outreach Program produced new fact sheets (see order form), and a poster describing pollutant inputs to the Sound and how citizens can help. We are distributing the poster to libraries, schools, town halls, and Long Island Sound user organizations.

The LISS newsletter produced by the Long Island Sound Taskforce (LIST), a regional chapter of the Oceanic Society, got a facelift and a new name in 1988. The *LISS Update* (formerly the *Long Island Sound Report*) provides timely coverage of the Study to over 5000 people. LIST personnel working on the *Update* are joined by the Sea Grant Coordinators and U.S. Environmental Protection Agency staff, who serve as advisory editors helping to identify topics for coverage. Outreach staff also contributed to many articles for newspapers published throughout the greater LISS area.

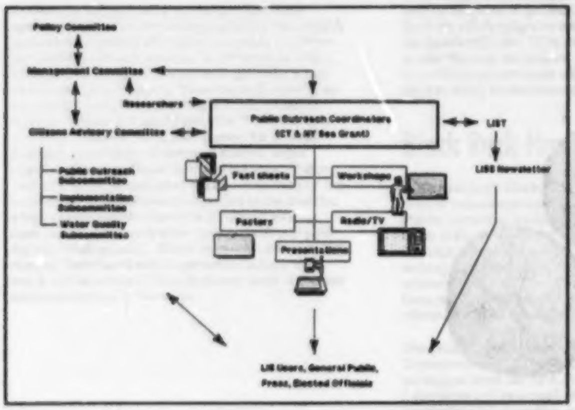

Policy Committee
Management Committee
Researchers
Citizens Advisory Committee
Public Outreach Subcommittee
Implementation Subcommittee
Water Quality Subcommittee
Public Outreach Coordinators
(CT & NY Sea Grant)
LIST
LISS Newsletter
Fact sheets
Workshops
Posters
Radio/TV
Presentations
LIS Users, General Public,
Press, Elected Officials

Figure 16. LISS Public Outreach is a multifaceted program. (From Chester Arnold, Connecticut Sea Grant.)

Major educational programs conducted by the Public Outreach Program included a lecture series held in eastern Connecticut, sessions at both the Connecticut and New York annual Marine Fisheries Forums, and the 1988 State of the Sound Conference held on Long Island and co-sponsored by LIST. In addition, LISS workshops for local elected officials were held in Connecticut in 1988 and in New York in 1989. The workshops, co-sponsored by members of the Long Island Sound Congressional Caucus, focused on potential local impacts of upcoming state water quality programs. Both coordinators were kept busy giving slide presentations to civic associations, user groups, municipal commissions, and other interested organizations.

Program staff members were interviewed on radio and television, and LISS became a regular feature on Long Island radio's widely broadcast public service announcement series "About Long Island." In November, Katharine Hepburn narrated a public service announcement distributed to 10 major television stations in the two states. The announcement was shown in the spring of 1989.

Public Participation

Public participation, the important task of soliciting citizen input to the LISS, is accomplished largely through the Study's Citizen's Advisory Committee (CAC). The CAC, made up of representatives of organizations concerned with the Sound, is charged with providing guidance and advice to the Management Committee.

During 1988, emphasis was placed on expanding the membership of the CAC and improving communication between it and the Management Committee. The 36 current members of the CAC represent the spectrum of the geographic, political, and user constituencies of the area around Long Island Sound. In addition to its expansion, the CAC adopted bylaws, elected new Chairs, and formed subcommittees focusing on water quality, implementation, and public outreach. In the coming year the CAC subcommittees will collect information in these three areas and make recommendations to the Management Committee.

The Future

As the public becomes more aware of the problems in the Sound, timely and accurate information about the LISS becomes even more important. During 1989, the LISS Public Outreach Program will emphasize written materials that translate LISS technical reports into terms understandable to the public, use of the mass media to spread its message, and work with local officials.

DATA MANAGEMENT

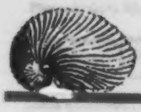
One of the goals of the LISS is to make information easily available to those who need the data to understand and successfully manage the Sound. Many agencies are collecting various kinds of data in huge amounts, and management of this information is a complicated task. To decide the best way to handle the information being collected, the LISS has begun a study of user needs.

In October of 1988, 137 potential users of LISS data were asked to fill out a questionnaire. The response rate was 60 percent, or 82 potential users. Preliminary survey results indicate that most users want a centralized computer database with an on-line index that they can search to determine what data are available. They would like to be able to access the information either as raw data or as summary reports.

In addition, 10 group interviews were conducted with key agencies involved in collection, analysis, and interpretation of data from the Sound. These interviews indicated that those who generate data handle it in a variety of ways. This group is also in favor of a centralized database, estimating that up to 25 percent of their efforts are spent on data management. The quality of the information received from others was a major concern to those who synthesize data from Long Island Sound.

During the coming year a conceptual design for a centralized system will be developed. Existing systems will be evaluated to see which one can fill the LISS requirements. Costs will be estimated and a plan for implementing a database management system will be produced.

Photograph by Arthur Glowka.



THE FUTURE OF THE LONG ISLAND SOUND STUDY

By October 1989, scientists from a variety of universities and agencies will have conducted the most extensive and comprehensive sampling of water in Long Island Sound ever undertaken. The new information, along with historical data, will be used to calibrate and validate the water quality and hydrodynamic models. Once calibrated, validated, and coupled, the models will help the LISS evaluate potential solutions to the Sound's hypoxia problem.

Managing the Flow of Nutrients to Long Island Sound

The Long Island Sound management plan, or Comprehensive Conservation and Management Plan (CCMP), is scheduled for completion in November 1991. We plan, however, to begin addressing the hypoxia problem in advance of November 1991, using preliminary runs of the coupled hydrodynamic and water quality models. Possible actions that might be taken to reduce the load of nutrients to the Sound include the upgrading of sewage treatment plants to decrease the amount of nitrogen discharged in the effluent, the adoption of Best Management Practices on agricultural lands, and the treatment of stormwater runoff. For better or worse, Long Island Sound's hypoxia problem is not unique. Work under way in the Chesapeake Bay, where low levels of dissolved oxygen have been a focus of study and concern since the mid 1970s, may provide the LISS with useful guidance on potential strategies for nutrient reduction. Preliminary runs of models developed for the Chesapeake Bay led to a recommended 40 percent reduction in nutrient inputs to the Bay, and the states have drafted a strategy on how best to achieve this reduction.

Development of the Comprehensive Conservation and Management Plan (CCMP)

What is the CCMP? Who will write it and how will it be implemented? The CCMP will address the problems of hypoxia, toxic contamination, living marine resource management, pathogens, and floatable debris in Long Island Sound. An outline was written in late 1988 and the completed management plan, due in November 1991, will consist of a summary as well as five modules, or sections, on the problems examined by the LISS. Also to be included is one module assessing existing management programs and past planning efforts. In addition, the CCMP will recommend applications of site-specific case studies. These case studies will contain stormwater management recommendations based on a project in Mamaroneck Harbor, Mamaroneck, New York, and toxic contaminant management recommendations based on a study of Black Rock Harbor in Bridgeport, Connecticut.

Over the next two years, the CCMP will be developed by a LISS staff person working with the LISS, scientists, regulators, and the public to prepare the summary document, modules, and case-study recommendations. New York Sea Grant and Connecticut Sea Grant, as well as other LISS participants, will help coordinate involvement of the public in the CCMP development process. Formal mechanisms for participation by the public will be established and publicized in the coming year.

To date the LISS has completed three years of intensive data collection and research, yet more exciting and challenging times lie ahead. Monitoring activities will continue to be important to the modeling work and to measurement of improvements in the Sound after additional pollution controls are in place. Work will also continue at the EPA Narragansett Laboratory, the Connecticut Department of Environmental Protection, and elsewhere to determine how much dissolved oxygen is necessary to maintain healthy populations of shellfish and finfish in the Sound. Other projects planned for 1989 include the design and development of a data management system for the LISS and the implementation of a demonstration project for management of agricultural nutrients.

1988 RESEARCH PROJECTS

Hypoxia

Water Quality Modeling

A water quality model is being developed to provide a tool for assessing the causes of hypoxia (low dissolved oxygen) and for evaluating management options to alleviate the problem.

John St. John and Dominic DiToro,
HydroQual, Inc. .... *$ 205,000.*

Hydrodynamic Modeling and Data Collection

Data on currents, tides, and meteorology of the Sound were collected for use in the hydrodynamic (water circulation) model, and development of the model began.

Henry Frey, National Oceanic and Atmospheric
Administration .... *$ 700,000.*
(NOAA Congressional Appropriation for LIS)

Collection of Water Quality and Hydrodynamic Data

To provide data for the models, stations throughout the Sound were visited periodically (weekly, every other week, or monthly, depending on the site), using research vessels. Some measurements (e.g., dissolved oxygen and salinity) were made in situ, and for others, water samples were prepared for laboratory analysis. In addition, current meters were placed on north-south transects across the Sound to measure water flow.

Henry Bokuniewicz and Mario Vieira, State University of New York at Stony Brook, and Frank Bohlen, University of Connecticut .... *$ 697,473.*

Collection of Salinity and Temperature Data from the East River and the Race

Continuous salinity and temperature data were collected in the East River and the Race to provide information from the Sound's boundaries for the hydrodynamic model.

Frank Bohlen, University of Connecticut, and Howard Golub, Interstate Sanitation Commission .... *$ 86,744.*

River Monitoring

To provide information on pollutant sources, rivers discharging to the Sound were monitored twice a month for key parameters such as nitrogen and phosphorus.

Paul Stacey, Connecticut Department of Environmental Protection, and Dennis Healy,
U.S. Geological Survey .... *$ 22,000.*

Analysis of Water Quality Samples

To provide information for the water quality model, samples of water collected from numerous sites throughout the Sound were analyzed for key parameters such as nitrogen and phosphorus.

Robert Weinbloom, New York State Department of Health, Michael Bonomo, YWC, York Laboratories, and Janet Kapish, Connecticut
Department of Health .... *$ 472,754.*

Analysis of Additional Nutrient Samples

Water samples were collected and analyzed to provide additional information on nutrients in the Sound.

Carl Zimmerman, Chesapeake Biological
Laboratory .... *$ 2,520.*

Analysis of Oxygen and Nutrient Fluxes in Sediments

To assess the role of sediments in contributing to hypoxia (low dissolved oxygen), fluxes of oxygen into the sediments and nutrients out of the sediments were measured at several sites throughout the Sound.

Kirk Cochran, James Mackin, Robert Aller, David Hirschberg, and Josephine Aller, State University
of New York at Stony Brook .... *$ 237,215.*

Analysis of the Water Column as a Source and Sink of Oxygen

To determine the role of the water column in contributing to hypoxia (low dissolved oxygen), production and use (via respiration and decay) of oxygen was measured at several sites in the Sound.

Barbara Welsh, University of Connecticut ... *$ 193,547.*

Development of Dissolved Oxygen Criteria

The response of organisms to different oxygen levels is being tested to determine how much oxygen is sufficient to maintain healthy populations of fish and shellfish.

Donald Miller, EPA Environmental Research
Laboratory .... *$ 10,000.*

Phytoplankton Monitoring

Major functional groups of phytoplankton (marine plants) were identified to supplement information on production and consumption of oxygen in the Sound.

[illegible] Freudenthal . . . . $ 10,000.

Toxic Contaminants

Toxics Studies

To assess contaminant patterns in the Sound, and to allow comparisons with other bodies of water, mussels and winter flounder were collected from several sites in the Sound and analyzed for a variety of metals and organic compounds.

Thomas O'Connor, National Oceanic and Atmospheric Administration . . . . $ 300,000.
(NOAA Congressional Appropriation for LIS)

Reproductive Success of Fish and Shellfish

To determine if contaminants are affecting the ability of resident organisms to reproduce and survive, lobster, winter flounder, and hard clams from various sites were collected and tested in the laboratory.

Anthony Calabrese, National Oceanic and Atmospheric Administration

Other Projects

Also see Black Rock Harbor Project listed under ACTION PLAN DEMONSTRATION PROJECTS.

Public Education And Participation

Public Education and Participation Program

Various media, including fact sheets, posters, slide presentations, workshops, radio and television, were used to generate and disseminate information about the LISS and to foster and support active involvement by the public in the LISS and its concerns.

Edward Monahan, Connecticut Sea Grant, and Michael Voiland, New York Sea Grant and Cornell Cooperative Extension . . . . $ 161,000.

LISS Annual Report and Co-Chair Travel

Each year, an Annual Report similar to this one is prepared, summarizing activities and major findings of the Study. In addition, travel funds are administered to allow Co-Chairs of the Technical Advisory Committee and Citizens Advisory Committees to attend LISS meetings.

Tracy Stenner, Battelle . . . . $ 16,000.

LISS Update and CAC Budget

The LISS newsletter was produced six times annually and Citizens Advisory Committee members were reimbursed for travel expenses incurred en route to and from the CAC meetings.

Kathryn Clark and Richard Schreiner, Long Island Sound Taskforce . . . . $ 11,500.

Program Administration

Funding for New York State Department of Environmental Conservation's (NYS DEC) Coordinator

NYS DEC employs a LISS coordinator who assists in managing the study and works to integrate findings of the LISS into NYS DEC activities. In 1988, this staff person coordinated sample collection and analysis.

Karen Chytalo, New York State Department of Environmental Conservation . . . . $ 59,000.

Funding for Connecticut Department of Environmental Protection's (CT DEP) Coordinator and Administration of Long Island Sound Study (LISS)

CT DEP employs a LISS coordinator who assists in managing the study and works to integrate findings of the LISS into CT DEP activities. In 1988, this staff person coordinated sample collection and analysis.

Paul Stacey, Connecticut Department of Environmental Protection . . . . $ 49,000.

Action Plan Demonstration Projects

Mamaroneck Harbor Project

The objectives of this project are to relate urban stormwater discharges to receiving water quality modeling techniques, to quantify allowable stormwater loadings, and to identify and implement Best Management Practices (BMPs) capable of achieving the allowable stormwater loadings.

Barbara Finazzo, EPA Region II . . . . $ 295,000.

Black Rock Harbor Project

The goal of the project is to reduce the input of toxic contaminants to Black Rock Harbor and to reduce the risk to living marine resources, including valuable oyster fisheries. Based on information gathered by the Project, a management plan for the Harbor will be developed to provide the basis for changes in permits issued through Connecticut's NPDES program.

Paul Stacey, Connecticut Department of Environmental Protection, and John Scott, Science Applications International Corporation .... *$ 470,000.*

Additional Projects

Completion of Blackline Maps of Long Island Sound

Blackline maps, on two different scales, of the area surrounding Long Island Sound were developed to serve as common reference materials for researchers and managers.

Sidney Quarrier, Connecticut Department of Natural Resources Center .... *$ 20,000.*

Federal Consistency Report

To ensure that Federally funded projects in New York and Connecticut are consistent with the recommendations of the LISS, a report is being prepared summarizing how activities of projects funded by the Federal Government affect the Sound.

Howard Golub, Interstate Sanitation Commission .... *$ 20,000.*

Development of a Database Management System

Data generated and compiled by the LISS will be entered into a database management system that will persist and be updated with new data after the Study ends. These data will allow improvements in the Sound to be measured after management actions are taken. Selection of the database management system is under way.

Jeffrey Rosen, Computer Sciences Corporation .... *$ 20,000.*

ERRATA SHEET

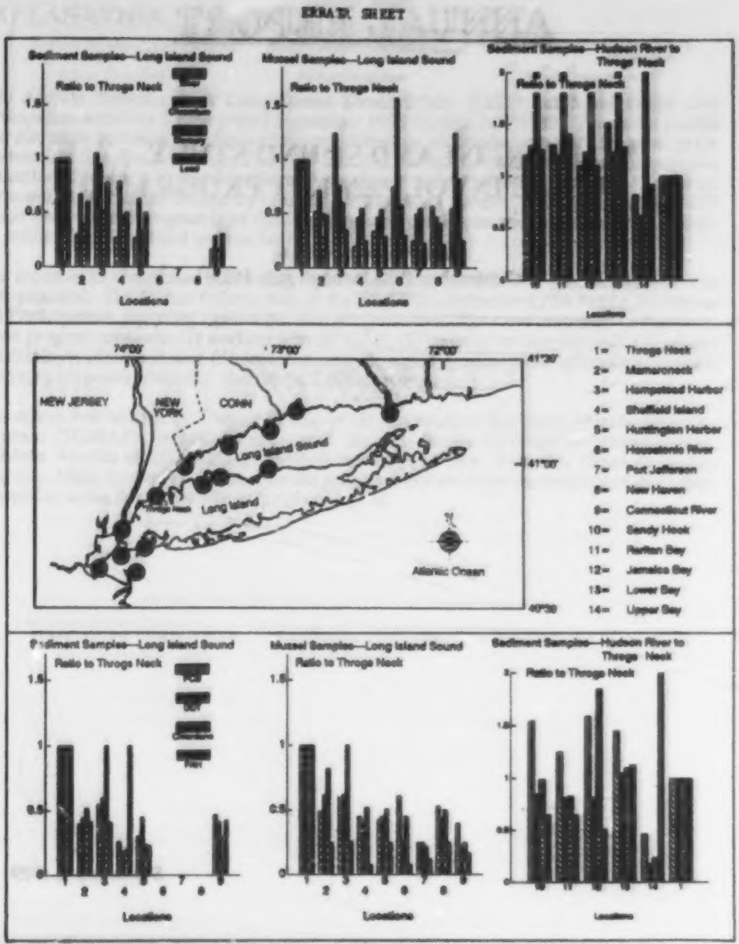


Figure 11. When the concentrations of some metals (top) and organic compounds (bottom) at sites in Long Island Sound and the Hudson-Raritan Estuary are compared to concentrations at Throgs Neck and a ratio is calculated, both mussels and sediment show a general western enhancement of contamination. (From Tom O'Connor, National Oceanic and Atmospheric Administration.)

ANNUAL REPORT

LONG ISLAND SOUND STUDY
PUBLIC INVOLVEMENT PROGRAM

FISCAL YEAR 1988
(September 1988 through July 1989)

September 1, 1989

EXPLANATION

This Annual Report covers Long Island Sound Study (LISS) public education and participation activities for the period September 1988 through July 1989. This is the second year that these activities have been jointly conducted by the Marine Advisory Program of the Connecticut Sea Grant College Program and the University of Connecticut Cooperative Extension System, and the Sea Grant Extension Program of the New York Sea Grant Institute and the Cornell University Cooperative Extension System. The purpose of the LISS public involvement program is to develop, organize, and implement a campaign to inform the public about the Sound and the Study.

This report is an unsolicited accounting and as such does not follow a specific Sea Grant or EPA protocol. The format follows that of the FY 88 Workplan for LISS Public Education and Participation, reporting against the nine program areas that were identified in that plan. These program areas are: (1) working with the CAC; (2) mailing list development; (3) posters and displays; (4) fact sheets; (5) presentations; (6) working with public officials; (7) media coverage; (8) youth education; and (9) the LISS newsletter.

This report was written by Chester Arnold of the Connecticut Sea Grant Marine Advisory Program (SGMAP), in collaboration with the two Public Participation Coordinators, Kathleen Rhodes of SGMAP and Melissa Beristain of New York Sea Grant Extension Program. More detailed information on the programs and activities summarized in this report is available at the Sea Grant offices listed on page iii.

SUMMARY

The Sea Grant programs of Connecticut and New York joined the Long Island Sound Study (LISS) in September 1987, during its third year. Chester Arnold of Connecticut Sea Grant Marine Advisory Program served as the acting project coordinator until January 1988, when Kathy Rhodes was hired as the full-time Connecticut Public Participation Coordinator. In July 1988 Melissa Beristain was hired by the New York Sea Grant Extension Program as the New York Public Participation Coordinator. Thus, while the period covered in this report is the second year of Sea Grant participation in the Study, it is the first year of a fully staffed public education and participation program.

Accordingly, the year was one of continued program growth and development, with emphasis placed on the expansion and solidification of initiatives begun in FY 87. Major accomplishments include:

* *expansion of the Citizens Advisory Committee (CAC) to 37 members, establishment of 3 working CAC subcommittees, organization of the first joint meeting between the CAC and Management Committee, and initiation of CCMP review by the CAC*

* *development of 8 LISS fact sheets, with 62,000 copies in print*

* *development and wide distribution of an LISS poster*

* *over 70 presentations to civic associations, elected officials, and LIS user group organizations (and an equal number of presentations by CAC members)*

* *organization of a LISS workshop for over 70 New York local and state officials, co-sponsored by the NY members of the LIS Congressional Caucus*

* *LISS information incorporated into over 50 newspaper articles, including 4 major multi-article special series*

* *regularly played LISS radio public service announcements on Long Island, and two television PSAs developed and filmed for wide distribution on 10 major area networks*

* *improvement of the LISS newsletter through close editorial collaboration with the LIS Taskforce*

In FY 87 the public involvement program successfully integrated itself into the LISS. During FY 88, the program accomplished the more difficult task of integrating itself into the Long Island Sound picture as a whole. The marine science training of the Coordinators, coupled with the growing track record of programs and publications, served to establish the public involvement offices as an accurate and accessible source of information on both the Sound and the Study. Citizens, organizations, elected officials, and the press now routinely call the Coordinators not only for the facts, but for an explanation of those facts, or a referral to other resources.

The result has been enhancement of the visibility and viability of the LISS in the eyes of the public - the ultimate arbiters of the success or failure of the Study.

LISS PUBLIC INVOLVEMENT OFFICES

Melissa Beristain **New York Coordinator**	**New York Sea Grant Extension Program** **Dutchess Hall, SUNY Stony Brook** **Stony Brook, NY 11794-5001** **(516) 632-8737**
Kathleen Rhodes **Connecticut Coordinator**	**Sea Grant Marine Advisory Program** **43 Marne Street** **Hamden, CT 06514** **(203) 789-7865**
Chester Arnold **Program Advisor**	**Sea Grant Marine Advisory Program** **43 Marne Street** **Hamden, CT 06514** **(203) 789-7865**

1. Citizens Advisory Committee

During FY 88 the Citizens Advisory Committee (CAC) continued to grow, both in size and in the scope of its contribution to the LISS. The 37 current Committee members represent a wide range of LIS-related interests and are drawn from throughout the geopolitical area of the Sound (contact Sea Grant for a complete list of members). Late in 1988 the Committee began to truly fulfill its advisory function by providing valuable commentary on the preliminary outline of the LISS Comprehensive Conservation and Management Plan (CCMP). The CAC also became more active in making their opinions known outside the Study, sending letters in support of LISS activities on several occasions to both federal and state officials.

In order to more efficiently pursue its interests, the CAC formed three subcommittees at the end of FY 87: Water Quality, Implementation, and Public Outreach. During FY 88 the subcommittees, each aided by a Sea Grant staff person, began projects of their own. Half of each CAC meeting is now given over to subcommittee meetings.

Major CAC-related accomplishments are summarized below, followed by a list of CAC meetings held during FY 88.

Accomplishments

- *CAC membership was expanded from 25 to 37 member organizations.*
- *6 CAC meetings were held, with an average attendance of about 17 members (see following list of meetings).*
- *Over 70 presentations on the LISS were given by CAC members to a variety of groups and organizations.*
- *The first joint CAC/Management Committee meeting was held 11/01/88.*
- *The CAC twice provided comments on the CCMP outline to the Management Committee.*
- *Meetings are now on a regular schedule with regard to both time and place; subcommittee meetings constitute a significant portion of each meeting.*
- *A 2-page informational sheet on the CAC is now available from the Communicators.*
- *Informational sessions on various aspects of LIS water quality are now a regular feature of CAC meetings (roughly every other meeting - see list below).*

Citizens Advisory Committee Meetings, FY 88

09/15/88
26 Federal Plaza, New York City
attendance: 27 (17 members, 4 guests, 6 advisors)
presentation on wastewater treatment by Jeannette Semon, City of Stamford

11/01/88
Pfizer, Inc., New York City
attendance: 25 (17 members, 4 guests, 4 advisors)
joint meeting with the Management Committee

12/01/88
Village Hall, Port Jefferson, NY
attendance: 17 (11 members, 2 guests, 4 advisors)

02/09/89
Greater Bridgeport Regional Planning Association, Bridgeport, CT
attendance: 37 (18 members, 13 guests, 6 advisors)
presentation on toxic contaminants by Paul Stacey, CT DEP

04/06/89
Pfizer, Inc., New York City
attendance: 31 (19 members, 8 guests, 4 advisors)

06/08/89
Village Hall, Port Jefferson, NY
attendance: 32 (18 members, 7 guests, 7 advisors)
presentations on SPDES programs by Michael Harder, CT DEP and Phil Barbato, NYS DEC

2. Mailing List

The LISS "network" mailing list, composed of about 2500 organizations, public officials, and other key contacts, was assembled by Sea Grant and is maintained in the Connecticut Coordinator's office. This list is almost certainly the largest and most accurate database of LIS contacts in existence. New additions to the network are sent an introductory letter and the latest available LISS information. A full network mailing of the 1987 LISS Annual Report and LISS fact sheets 1-3 was sent out in the spring of 1989.

Additions to the LISS mailing lists are made through personal contact and responses to printed LISS materials, public service announcements, newpaper articles, and radio and television appearances. The "Get Involved with the LISS" flyer, which is distributed at conferences, workshops, and presentations, has proven to be very effective. The flyer has been printed 3 times since the inception of the program, and over 8000 of the 10,500 copies have been distributed. The majority of responses to the flyer are sent to the LIS Taskforce for inclusion in the LISS master mailing list of individuals, to which the *LISS Update* newsletter is mailed. This list now totals about 5100.

__*Accomplishments*__

- *Network list of key contacts maintained by SG totals 2500; master list maintained by LIST totals 5100.*

- *Network mailing in spring 1989 of 1987 LISS Annual Report and three fact sheets.*

- *10,500 "Get Involved" flyers printed, about 8000 distributed.*

3. Posters and Displays

In March 1989 1500 copies of a LISS poster designed by Melissa Beristain were printed. The 3-color, 20"x25" poster describes the LISS and its goals, identifies environmental threats to the Sound, and outlines what concerned citizens can do to help. Posters were distributed to schools, libraries, town halls, marinas, Chambers of Commerce, and marine education organizations throughout the area, as well as being placed in the offices of the major cross-Sound ferries. Distribution is continuing, aided by the CAC Public Outreach Subcommittee.

Wider exposure for the poster and the Study was made possible in June 1989, when a special grant from Cornell Cooperative Extension enabled Beristain to have the poster displayed on Long Island Railroad (LIRR) cars for the entire month of July.

No permanent LISS displays were made. However, a portable LISS display was brought to 12 public events during the course of the year; these events are included in the listing of presentations in section 5.

Accomplishments

- *LISS poster developed; 1500 copies printed, approximately 1200 copies distributed.*
- *LISS poster displayed on 464 cars of the Long Island Railroad for the month of July 1989, exposing over 2.1 million people to information on the LISS.*
- *LISS display present at 12 public events.*

4. Fact Sheets

7 new fact sheets were developed and printed during FY 88, bringing the total number in the series to 8. 62,000 fact sheets have now been printed. The fact sheets have proven to be very popular, and are often reproduced (both with and without permission) in newspaper articles, trade magazines, and newsletters. For instance, the fact sheets appear as a regular feature of both the *"On The Water"* newsletter of the Suffolk County (NY) Cooperative Extension Marine Program, and the new boating magazine *Long Island Power and Sail.* They have also been requested as registration materials for most major LIS conferences conducted during the year, including conferences organized by Connecticut DEP, Schooner, Inc., the NYS Marine Education Association, and the LIS Taskforce.

The fact sheets cover major research areas of the LISS such as hypoxia, modeling, nonpoint source pollution, and floatable debris. Citizen concerns, such as seafood safety and how to get involved in LIS, are also being addressed. Fact sheet information is summarized in table form below.

LONG ISLAND SOUND STUDY FACT SHEET SERIES

#	*title*	*author*	*printed*	*pages*	*copies*	*printings*	*circulated*
1	Hypoxia in LIS	CLA	2/88	2	8500	3	7500
2	Modeling LIS	CLA	11/88	2	9500	2	3500
3	Wastewater Treatment	MAB	4/89	4	5000	1	4000
4	The LISS: A Profile	KAR	7/89	4	10000	1	1000
5	Supporting the Sound	CLA	7/89	2	8000	1	2000
6	Priority Action Plan Demonstration Projects	KAR	7/89	2	8000	1	300
7	Nonpoint Source Pollution in LIS	MAB	6/89	4	8000	1	1500
8	Floatable Debris	CLA	8/89	4	5000	1	500

5. Presentations

Sea Grant staff made over 70 presentations during FY 88, speaking about the Long Island Sound Study to groups as diverse as school children and federal elected officials. In keeping with the program's goal of educating on a local level, many of the presentations were to civic groups such as garden and rotary clubs. Information on LISS presentations given during the year is listed on the following pages.

During 1987, Long Island Sound emerged as a major issue, with many groups planning major conferences and workshops. In view of this fact, the public involvement program made a decision to cut back on organizing such conferences, in favor of providing information and support to these other efforts. This strategy turned out to be quite successful. For instance, during the spring of 1989 three different organizations holding major LIS conferences enlisted the help of the LISS public involvement program for agenda planning, mailing lists, registration materials, speaking, or some combination of these services. Thus, with an economy of resources the program was able to disseminate LISS information to about 700 people in a six week period.

LISS PUBLIC INVOLVEMENT PROGRAM PRESENTATIONS FY 88

Date	Event	Location	Number of Participants	Type of Event	Staff
09/01/88	Briefing for V.P. George Bush, Senator Weicker and Rep. Shays	Norwalk, CT	3	B,S	CA,KR
09/02/88	CT Environmental Caucus meeting	Hartford, CT	25	S	KR
09/21/88	1988 Eastern States Exposition	W. Springfield, MA	1500	D	KR
09/21/88	Oyster Bay Rotary Club	Oyster Bay, NY	50	S	MB
09/27/88	Briefing for Suffolk Co. Legislators	Hauppauge, NY	30	S,B	MB
09/30/88	Stamford Garden Club meeting "Pollution in LIS: Can we find a solution?"	Stamford, CT	90	O,P,S,S	CA,KR
09/30 to 10/02/88	Tobay Beach Boat Show	Tobay Beach, NY	thousands	D	MB
10/08 to 10/09/88	" " "	" "	"	"	"
10/11/88	State Senate Briefing	King's Point, NY	20	B,P,S	MB
10/17/88	Clinton Land Conservation Trust mtg	Clinton, CT	25	S	KR
10/18/88	Concerned Harbor Users of Milford mtg	Milford, CT	84	S	KR
10/26/88	Coastal Society 11th Annual Conference	Boston, MA	15	S	KR
11/02/88	Cornell CES marine county meeting	Ithaca, NY	28	S	MB
11/09/88	Suffolk Co. CES Marine Program Com.	Riverhead, NY	10	S	MB
11/12/88	Federated Conservationists of Westchester Co. conference for local officials	Purchase, NY	30	S,C	MB
11/30/88	"Fairfield 2000" annual conference	Bridgeport, CT	140	C,PL,CH	KR,CA
12/05/88	WEZN Radio interview	Bridgeport, CT	75000 est	R,S	KR
12/27/88	TV 30 interview	Hamden, CT	70000 est	TV,S	KR
01/09/89	Penfield Power Squadron meeting	Bridgeport, CT	40	S	KR
01/11/89	CT River Valley League of Women Voters	Old Lyme, CT	40	S	CA
01/12/89	Meeting with Fed. CT Marine Educators	New Haven, CT	13	WS,O	KR

KEY TO EVENT TYPE:

B briefing
C conference
D display
H public hearing

O organized by LISS Public Involvement
P panel of LISS speakers
PL on planning committee

R radio
S LISS Public Inv. speaker
TV television
WS workshop

Date	Event	Location	Number of Participants	Type of Event	Staff
01/13/89	LISS session, Long Is. Fishermen's Forum	Riverhead, NY	30	C,O,P,S	MB
01/24/89	LISS lecture at New England Chapter, Fed. Water Pollution Control Assoc. meeting	Boston, MA	50	S	KR
02/02/89	National Estuary Program conference	New York, NY	25	C,S	CA
02/02/89	Interview on LIS, WPOP Radio	Hartford, CT	100,000 aud	R,S	CA
02/11/89	Sierra Club February Jaunt	Litchfield, CT	40	S	KR
02/15/89	Byram Garden Club meeting	Greenwich, CT	11	S	KR
02/21/89	Essex Rotary Club	Essex, CT	30	S	CA
02/23/89	Meeting with Prof. CT Marine Educators	New Haven, CT	18	WS,O	KR
02/27/89	Massachusetts Environmental Educators Society annual meeting	Worcester, MA	150	D	KR
03/01/89	Sea Grant Week; talk on LISS Public Ed.	Charleston, SC	80	S	CA
03/02/89	Quinnipiac College Sigma Zi meeting	Hamden, CT	17	S	KR
03/03/89	Public hearing on marine pollution, U.S. Senate Envtl Conservation Committee & NYS Senate Subcom. on the LI Marine Dist.	New York, NY	30	B,H,S	MB
03/11/89	Eleventh Annual State of the Sound Conf.	Hamden, CT	100	S,C	KR
03/14/89	CT Vocational Agriculture Teachers workshop and professional meeting	Wilton, CT	25	S	KR
03/18/89	CT Science Educators Annual Conference	New Britain, CT	20	S,C	KR
03/23/89	Westchester Community College "Save Our Sound" Lecture Series	Rye, NY	30	LS,S	CA
03/27/89	Clinton Leisure Club meeting	Clinton, CT	40	S	KR
04/01/89	LISS session at CT Marine Fisheries Forum	Groton, CT	25	O,S,P,CH	KR,CA
04/07/89	Pequot Yacht Club Friday Night Dinner	Fairfield, CT	50	S	KR
04/10/89	NY Local Government LISS Workshop (co-sponsored with LIS Congressional Caucus)	King's Point, NY	70	WS,O,S	MB
04/12/89	Friends of the Bay meeting	Cold Spring Harbor, NY	70	S	MB
04/12/89	East Lyme Junior HS Science Teachers	East Lyme, CT	5	S	CA
04/13/89	Conference on Coastal Marine Issues for Secondary School Teachers (co-sponsored with Cornell Cooperative Extension)	Melville, NY	40	C,O,S,S	MB,CA
04/14/89	Briefing for Senator Lieberman and EPA Administrator Reilly	New Haven, CT	12	B,S	CA
04/25/89	TV 61 news interview	Milford, CT	70000 aud	TV,S	KR
04/27/89	UCONN Water Quality Workshop	Storrs, CT	110	WS,S	CA
04/29/89	Schooner, Inc. "Sounding Off" Conference	New Haven, CT	200	C,PL,S	KR
05/05/89	Project Oceanology Workshop for National Vocational Agriculture Teachers	Groton, CT	35	WS,S	KR
05/10/89	CT CES Hamden Office Open House	Hamden, CT	30	D	KR,CA
05/12/89	Connecticut Cooperative Extension System 75th Anniversary celebration	Storrs, CT	100	D	KR,CA
05/13/89	National Audubon Soc. LIS Campaign Meeting	Greenwich, CT	35	S	CA
05/22/89	Suffolk County Science Teachers Assoc.	Selden, NY	30	S	MB
05/24/89	Westbrook Senior Club meeting	Westbrook, CT	55	S	KR
05/24/89	Public Hearing on Floatable Marine Debris, U.S. Senate Envtl. Conserv. Committee & NYS Senate Subcom. on the LI Marine District	Hempstead, NY	50	H,S	MB
05/24/89	New Rochelle League of Women Voters mtg.	New Rochelle, NY	35	S	MB
05/25/89	Long Island Maritime Center Fundraiser	Huntington, NY	100	D	MB

KEY TO EVENT TYPE:

B	*briefing*	*O*	*organized by LISS Public Involvement*	*R*	*radio*
C	*conference*			*S*	*LISS Public Inv. speaker*
D	*display*	*P*	*panel of LISS speakers*	*TV*	*television*
H	*public hearing*	*PL*	*on planning committee*	*WS*	*workshop*

Date	Event	Location	Number of Participants	Type of Event	Staff
06/03/89	Sierra Club Coast Awareness Weekend	East Lyme, CT	50	S	KR
06/04/89	Long Island South Shore Audubon Society Family Nature Festival	Freeport, NY	2000	D	MB
06/09/89	Ridge Road School lecture	North Haven, CT	60	S	KR
06/10/89	Hudson River Rally Festival	Croton, NY	100	D	MB/CAC
06/14/89	New Haven Harbor Petroleum Coop meeting	New Haven, CT	15	S	KR
06/14/89	LISS presentation to Deans and Directors of Cornell University	Riverhead, NY	50	S	MB
6/15/89	CT Expanded Food and Nutrition Program workshop with Project Oceanology	Groton, CT	10	D	KR
06/17/89	LISS CAC workshop with Project Oceanology	Stamford, CT	30	WS,O,P,S	CA,KR
06/21/89	Project O workshop for local officials	South Norwalk, CT	30	WS,S	KR
06/22/89	Project O workshop for local officials	Bridgeport, CT	30	WS,S	KR
07/01/89	Guilford Harbor Festival	Guilford, CT	500	D	KR,CA
07/09/89	SoundWaters Inaugural Celebration	Rye, NY	200	D	KR/CAC
07/12/89	CT/RI Extension Agents workshop	Groton, CT	20	WS,S	KR
07/31/89	CT Cooperative Extension Eastern Dist. mtg.	Groton, CT	15	WS,S	KR

KEY TO EVENT TYPE:

B briefing
C conference
D display
H public hearing
O organized by LISS Public Involvement
P panel of LISS speakers
PL on planning committee
R radio
S LISS Public Inv. speaker
TV television
WS workshop

6. *Working with Public Officials*

While working with public officials is not the exclusive province of the public involvement program, the program considers the education of these officials to be of paramount importance to the success of the LISS. To this end, the program attempts to: (a) mail LISS information to elected officials at all levels of government; (b) conduct at least one major workshop per year updating local and state officials on the LISS; (c) respond promptly to any request for information by an elected official, or any opportunity to present LISS information to such officials.

Major accomplishments in this area are listed below. Please refer to the list of presentations (section 5) for additional information.

Accomplishments

- *Melissa Beristain organized a LISS Workshop for New York Local and State Officials, co-sponsored by the LIS Congressional Caucus members from that state. Over 70 representatives from village, town, county, state, and federal levels attended, including 4 Congressmen and 11 CAC members.*
- *Over 600 elected officials at all levels of government received the spring 1989 mailing of LISS educational materials.*
- *Through the help of the CAC, local elected officials on Long Island have received LISS information via personal contact with an informed citizen in their locality.*

- *At the request of Congressman Christopher Shays, Chester Arnold and Kathy Rhodes participated in a private briefing on LIS issues for then Vice President George Bush. Then Senator Weicker was also present.*

- *Chester Arnold was asked by the City of New Haven to speak on the LISS at a LIS briefing for Senator Joe Lieberman and EPA Adminstrator William Reilly.*

- *Melissa Beristain participated in 2 briefings and 2 hearings focusing on LIS, held by Suffolk County legislators, the NY State Senate, and the U.S. Senate Environmental Conservation Committee.*

- *Chester Arnold was invited by Connecticut State Senate President Pro Tempore John Larson to participate in sessions reviewing pending LIS legislation.*

7. *Media Coverage*

With "medical waste" supplanting hypoxia as the major LIS story of 1988, media coverage specifically focused on the LISS was not as extensive as last year. During FY 88, however, the Coordinators became firmly established as a good source of LIS information. Since reporters called the program for background information or an LISS viewpoint, the Study was included in many articles on general LIS issues. A conservative estimate is that during the year over 50 articles in newspapers throughout the region contained information supplied by the program. Of particular note were several multi-article feature series on the Sound by the *New Haven Register* (10/88 & 5/89), *Waterbury Republican* (4/89), and *Hartford Courant* (5/89). Clippings are available at the Sea Grant offices.

Public service announcements (PSAs) were the new LISS media initiative for FY 88. The LISS became a regular topic on the "About Long Island" radio feature, played extensively on 11 stations in Nassau and Suffolk counties. Two broadcast quality television PSAs were produced during the year, the first released for airing during spring 1989, and the second due to be released in August 1989.

Accomplishments

- *A 30-second television public service announcement, narrated by Katharine Hepburn, was produced and released to 10 major stations in LIS area.*

- *A 30-second television PSA was produced in June and July 1989 (scheduled for release in August 1989).*

- *The LISS became a regular feature on Long Island radio spots played on 11 stations.*

- *LISS information was incorporated into over 50 newspaper articles, including 4 major multi-article series.*

- *At least 10,000 copies have been reprinted of the "Turning the Tide" newspaper series by the Advocate, wich originally appeared in July 1988 and relied heavily on information supplied by LISS public involvement program. 1,000 copies were recently donated to the program by the Advocate publisher.*

8. *Youth Education*

While lacking the resources to develop materials and programming for school systems, the public involvement program provides support and information for educators interested in LIS-related topics. In April 1989, Coordinator Beristain organized a conference on coastal marine issues for secondary school teachers on Long Island. In addition, both Coordinators helped plan and/or spoke at a number of conferences for science teachers and marine educators. Please refer to the list of presentations in section #5 for additional information on these programs.

9. *LISS Newsletter*

At the end of FY 87 the LISS newsletter, produced by the Long Island Sound Taskforce, underwent a reorganization and a name change to *LISS Update*. Soon after, as a further addition to this reorganization, the Sea Grant Coordinators joined with LIST Director Rick Schreiner in a collaborative editorial arrangement aimed at improving the *Update*'s coverage of the Study. This three-person team now meets regularly to plan the newsletter, identifying topics, authors, and a central theme for each issue. Although it has taken some time to work out the process, the result is a more focused and interesting publication.

In addition to their editorial role, Sea Grant staff wrote 9 articles for the *Update* during FY 88. The *Update* is mailed to the LISS master mailing list of about 5100 individuals, and the goal of a bimonthly mailing schedule should be attained by fall of 1989.

Information on *Update* issues appears below.

Vol (#)	**Central Theme**	**Distribution Date**
1 (2)	sewage treatment	11/88
2 (1)	coastal management	2/89
2 (2)	LIS fisheries	5/89
2 (3)	toxic contaminants	8/89
2 (4)	citizen action	8/89
2 (5)	economics of LIS pollution	9/89
2 (6)	nutrient reduction	11/89
3 (1)	nonpoint source pollution	1/90
3 (2)	marine education	3/90

II

101ST CONGRESS
1ST SESSION

S. 1722

To establish in the Environmental Protection Agency a Long Island Sound Office, and for other purposes.

IN THE SENATE OF THE UNITED STATES

OCTOBER 3 (legislative day, SEPTEMBER 18), 1989

Mr. LIEBERMAN (for himself, Mr. MOYNIHAN, Mr. DODD, and Mr. D'AMATO) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

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A BILL

To establish in the Environmental Protection Agency a Long Island Sound Office, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Long Island Sound Improvement Act of 1989".

SEC. 2. EXTENSION OF MANAGEMENT CONFERENCE FOR LONG ISLAND SOUND.

(a) EXTENSION OF MANAGEMENT CONFERENCE.—Notwithstanding section 320(e) of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water

Act") (33 U.S.C. 1330(e)), the Administrator shall extend the management conference of the Long Island Sound conducted under such section after the date of termination of the initial period of such management conference for a period of time from the date of such termination until September 30, 1998, for the purposes indicated under section 320(b) of such Act (33 U.S.C. 1330(b)), making modifications to the management plan developed under such section 320(b), and for any additional purposes described in this Act.

SEC. 3. POLICY COMMITTEE OF THE MANAGEMENT CONFERENCE FOR LONG ISLAND SOUND.

(a) POLICY COMMITTEE.—There shall be established within the management conference a Policy Committee (hereafter in this section referred to as the "Committee").

(b) MEMBERS.—

(1) COMPOSITION.—The members of such Committee shall include the following:

(A) The Director of each regional office of the Agency that has jurisdiction in Long Island Sound, or a senior official representing the interests of such Director.

(B) The Commissioner of the New York State Department of Environmental Conservation, or a senior official representing the interests of such Commissioner.

(C) The Commissioner of the Connecticut Department of Environmental Protection, or a senior official representing the interests of such Commissioner.

(c) FUNCTIONS OF THE COMMITTEE.—The Committee shall—

(1) carry out the same policy-making responsibilities that the Policy Committee appointed under the Long Island Sound Study (authorized under section 320 of the Federal Water Pollution Control Act, commonly referred to as the "Clean Water Act") conducted immediately preceding the date of enactment of this subsection; and

(2) advise and inform the management conference concerning the operation of the Long Island Sound Office established under section 4 of this Act.

SEC. 4. LONG ISLAND SOUND OFFICE.

Title I of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act") (33 U.S.C. 1251 et seq.) is amended by adding at the end the following new section:

"SEC. 119. LONG ISLAND SOUND OFFICE.

"(a) FINDINGS, PURPOSES, AND DEFINITIONS.

"(1) FINDINGS.—The Congress finds that—

"(A) 10 percent of the population of the United States resides within 50 miles of the Long Island Sound;

"(B) under the National Estuary Program, the Environmental Protection Agency has designated the Long Island Sound as an estuary of national significance;

"(C) the Long Island Sound Study, conducted under the National Estuary Program, is scheduled for completion in less than 2 years;

"(D) such study will produce a conservation and management plan for Long Island Sound;

"(E) because Long Island Sound borders 2 States and falls into 2 regions of the Environmental Protection Agency, there is a need for a formal mechanism of cooperation and coordination in the implementation of such conservation and management plan; and

"(F) there is also a need to coordinate State and Federal efforts to prepare for future demands placed on the Long Island Sound by the surrounding population.

"(2) PURPOSES.—The purposes of this section are—

"(A) to continue, after the completion of the Long Island Sound Study conservation and management plan—

"(i) the balance of cooperation and coordination that the management conference of the Long Island Sound Study presently encourages between the States and Agency regional offices, and

"(ii) the participation of such management conference in the implementation of the conservation and management plan; and

"(B) to continue the Long Island Sound Study to address, at the time of the implementation of the conservation and management plan, the 'unfinished agenda' of the Long Island Sound Study, and initiate and complete new studies to be used to update, modify, and refine the conservation and management plan.

"(3) DEFINITIONS.—For purposes of this section, the term—

"(A) 'Administrator' means the Administrator of the Environmental Protection Agency;

"(B) 'Agency' means the Environmental Protection Agency;

"(C) 'conservation and management plan' means the comprehensive conservation and management plan developed by the Long Island Sound Study under section 320 of this Act;

"(D) 'Long Island Sound Study' means the study of Long Island Sound conducted under section 320 of this Act for the purposes of producing the comprehensive conservation and management plan required under such section 320;

"(E) 'management conference' means the management conference convened under section 320 of this Act for the purposes of producing the conservation and management plan, and for other purposes described in subsection (b) of such section 320; and

"(F) 'oil' means petroleum, including crude oil and any fraction or residue therefrom.

"(b) Long Island Sound Office.—

"(1) Establishment of office.—There is established in the Agency a Long Island Sound Office (hereinafter referred to as the "Office").

"(2) Location of office facilities.—The Office shall be located in the vicinity of Long Island Sound, at a location selected by the Administrator, acting through the Director, as follows:

"(A) such Office shall initially be located in either the State of Connecticut or New York; and

"(B) not less than once every 5 years thereafter, such Office shall be relocated to the State described in subparagraph (A) in which such office in not initially located under such subparagraph.

"(d) ADMINISTRATION AND STAFFING OF OFFICE.—

"(1) OFFICE DIRECTOR.—The Office shall be headed by a Director, who shall be appointed by the Administrator, from among the employees of the Agency who are in the civil service. The Administrator shall detail such employee of the Agency to serve as the Director. The Administrator shall delegate to the Director such authority as may be necessary to carry out the duties of the Director under this section.

"(2) OFFICE STAFF.—The Administrator shall detail not less than 3 full-time employees of the Agency to serve as administrative staff personnel to the Office for the purpose of assisting the Director. Upon the request of the Director, the head of the following Federal departments or agencies, and the head of any other Federal department or agency which the Director determines to be appropriate, shall detail, without reimbursement by the Agency, an employee who shall serve full time at the Office as a liaison to the Agency:

"(A) the United States Fish and Wildlife Service in the Department of the Interior;

"(B) the National Oceanic and Atmospheric Administration in the Department of Commerce;

"(C) the United States Army Corps of Engineers in the Department of the Army;

"(D) the United States Coast Guard in the Department of Transportation; and

"(E) the Department of Agriculture.

The Administrator may authorize the Director to hire additional staff if sufficient funds are available to fund such additional positions. To the extent allowable by law, and with the authorization of the Administrator, acting through the Director, the head of a State agency participating in the Long Island Sound Study may make available to the Office, without reimbursement to such State agency, the assistance of any of the personnel of such State agency.

"(e) DUTIES OF THE DIRECTOR.—The Director shall—

"(1) oversee, assist and support, to the extent allowable by law, the implementation and enforcement of the conservation and management plan for Long Island Sound developed under the Long Island Sound Study;

"(2) solicit information from the Long Island Sound Advisory Committee described in subsection (k) concerning enforcement priorities for the implementation of the conservation and management plan;

"(3) oversee the grant, research and planning programs authorized under this section;

"(4) on the basis of the information that the Director is required to request and collect under subsection (k), make recommendations to the heads of the regional offices of the Agency that have jurisdiction in Long Island Sound concerning enforcement activities to ensure the implementation of the conservation and management plan developed under the Long Island Sound Study; and

"(5) provide administrative support to the management conference.

"(f) LONG ISLAND SOUND OFFICE ADVISORY COMMITTEE.—

"(1) ESTABLISHMENT OF COMMITTEE.—There is established in the Long Island Sound Office a Long Island Sound Office Advisory Committee (hereafter in this section referred to as the 'Committee').

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"(2) MEMBERSHIP.—The Administrator, acting through the Director, shall initially appoint to the Committee the members of the Policy Committee of the management conference, established under section 3 of the Long Island Sound Improvement Act of 1989. A vacancy on the Committee shall be filled in the same manner as in which the initial appointment was made.

"(3) FUNCTIONS OF THE COMMITTEE.—The Committee shall assist the Director by developing goals, conducting research and planning activities, reviewing work plans for approval, and overseeing projects related to the development, implementation, and enforcement of the conservation and management plan.

"(g) INFORMATIONAL LEGISLATIVE MEETINGS.—The Director shall, through the Committee, convene conferences for legislators from State governments and political subdivisions thereof for the purpose of making recommendations for coordinating legislative efforts to facilitate the environmental restoration of Long Island Sound and the implementation of the conservation and management plan.

"(h) INFORMATION AND ASSISTANCE.—

"(1) COLLECTION AND DISTRIBUTION.—The Director shall collect and make available to the public publications and other forms of information that the Director determines to be appropriate, relating to the environmental quality of the Long Island Sound.

"(2) ASSISTANCE TO CITIZENS ADVISORY COMMITTEE.—The Director may, upon a determination by the Director of the appropriateness of providing such assistance, provide technical assistance and the use of Agency facilities to the Citizens Advisory Committee of the Long Island Sound Study.

"(i) COORDINATION OF AGENCY PROGRAMS.—The Director shall maintain, with the consent of such individuals, for purposes of coordinating activities relating to environmental restoration and the implementation of the conservation and management plan conducted through the Committee, and maximizing the availability of programs and resources which may serve such purposes, a continuing liaison with the heads of the following agencies or departments for the following purposes:

"(1) The United States Fish and Wildlife Service, for purposes of coordinating potential land acquisitions and wildlife refuge management activities.

"(2) The National Oceanic and Atmospheric Administration, for purposes of continuing and coordinating systems modeling of the Long Island Sound Study and activities under the National Undersea Research Program.

"(3) The United States Army Corps of Engineers, for purposes of coordinating activities relating to dredging and filling in Long Island Sound, including activities relating to the permit program under section 404 of this Act, and activities relating to the control of floatable pollutants.

"(4) The United States Department of Agriculture, for purposes of coordinating educational and other programs for farmers relating to nonpoint source pollution.

"(5) The United States Coast Guard, for purposes of coordinating oil spill contingency plans and other contingency plans for spills of toxic substances.

In coordinating agency and departmental programs under this section, the Director shall encourage the heads of such agencies and departments, to the extent permitted by law, to provide funding for the purpose of conducting such programs and activities.

"(j) OIL SPILL CONTINGENCY PLANS.—

"(1) STUDY AND REPORT.—The Director, acting through the Committee, shall not more than 180 days after the date of the enactment of this section, conduct a study and issue a report to the appropriate committees of the Congress for public distribution which—

"(A) describes in detail preparedness in the public and private sectors for oil spills in the vicinity of Long Island Sound;

"(B) incorporates recommendations, in addition to those supplied by the Agency, concerning the incorporation of any oil spill contingency plans for oil spills in Long Island Sound that the Director shall solicit, to the extent permitted by law, from the following departments or agencies:

"(i) the United States Coast Guard,

"(ii) the New York Department of Environmental Conservation,

"(iii) the Connecticut Department of Environmental Protection, and

"(iv) any other department or agency that the Director determines to be appropriate; and

"(C) includes suggestions for improving any oil spill contingency plan prepared by a department or agency described in clauses (i) through (iv) of subparagraph (B).

"(2) PROHIBITION CONCERNING DUPLICATIVE STUDIES.—Notwithstanding paragraph (1), if the Director makes a determination that—

"(A) a comparable study exists for the determination of information required in the study under paragraph (1); and

"(B) such comparable study adequately addresses the information required for the study under paragraph (1),

the Director shall not duplicate such study in the preparation of the study and report required under paragraph (1), but shall incorporate the results of such comparable study into the report required under paragraph (1).

"(k) ENFORCEMENT AND COMPLIANCE.—Not more than 180 days after the date of the enactment of this section, and four times each calendar year thereafter, the Director shall solicit from the head of each regional office of the Agency that has jurisdiction in Long Island Sound a quarterly report outlining enforcement issues relating to the environmental restoration, conservation, and management of Long Island Sound. The Director shall provide the Committee with a copy of each such report. The Director shall designate a staff member of the Long Island Sound Office as an Office Director for Enforcement Evaluation. The Office Director for

Enforcement Evaluation shall brief the Director concerning such enforcement issues, and assist in the coordination of enforcement activities with other departments and agencies.

"(l) Citizen Involvement and Education, Enforcement, and Research and Planning Grants.—

"(1) Citizen involvement and education grants.—The Administrator, acting through the Director, and in consultation with the Committee, may make Citizen Involvement and Education Grants from the Long Island Sound Fund, established under section 5 of the Long Island Sound Improvement Act of 1989, to citizen organizations and to governments of political subdivisions of States for the purposes of funding—

"(A) activities related to the environmental cleanup and monitoring of Long Island Sound; and

"(B) educational programs to encourage the environmental restoration of Long Island Sound.

"(2) Enforcement grants.—The Administrator, acting through the Director, and in consultation with the Committee, may make Enforcement Grants from the Long Island Sound Fund, established under section 5 of the Long Island Sound Improvement Act of 1989, to States for the purpose of funding—

"(A) supplemental personnel responsible for conducting enforcement activities related to the environmental restoration, conservation, and management of Long Island Sound; and

"(B) special enforcement needs related to environmental restoration, conservation, and management activities of Long Island Sound, including improving computer access to enhance enforcement activities.

"(3) Research and planning grants.—The Administrator, acting through the Director, and in consultation with the Committee, may make Research and Planning Grants from the Long Island Sound Fund, established under section 5 of the Long Island Sound Improvement Act of 1989, to fund any research or planning activity described in subsection (l).

"(4) Grant requirements.—The Administrator, acting through the Director, may, by regulation, prescribe eligibility requirements, and other requirements that the Administrator determines to be appropriate, for grants under paragraphs (1) through (4).

"(5) Reports.—Any entity that receives a grant under this subsection shall, within 18 months after the date of receipt of such grant and biennially thereafter, report to the Administrator, the Director, and the

Committee on the progress made in carrying out the objectives of such grant. The Administrator, acting through the Director shall transmit each such report along with the comments of the Administrator, the Director, and the Committee, to the Congress.

"(m) IMPLEMENTATION GRANTS.—

"(1) IMPLEMENTATION GRANTS.—The Administrator, acting through the Director, shall at the request of the Governor of a State affected by the conservation and management plan (hereinafter in this subsection referred to as the 'plan') make a grant from the fund established in section 5 of the Long Island Sound Improvement Act of 1989 (hereafter in this paragraph referred to as the 'fund') for the purpose of implementing the management mechanisms contained in the plan if such State has within 1 year after the date of the completion of the Long Island Sound Study approved and committed to implement all or substantially all aspects of the plan that apply to such State.

"(2) APPLICATION PROCESS FOR IMPLEMENTATION GRANT.—A State or combination of States may apply for a grant under paragraph (1) by submitting to the Administrator acting through the Director, a comprehensive proposal to implement management mechanisms contained in the plan. Such proposal shall include—

"(A) a description of proposed abatement actions which the State or combination of States shall take within a specified period of time to reduce pollution in the Sound and to meet applicable water quality standards; and

"(B) the estimated cost of the abatement actions proposed to be taken during the fiscal year immediately following the date of such application, including the portion to be funded by such proposed grant.

If the Administrator, acting through the Director, and in consultation with the Committee, finds that such proposal is consistent with the national policies set forth in section 101(a) of this Act and shall contribute to the achievement of the national goals set forth in such section, the Administrator, acting through the Director, and consultation with the Committee, shall approve such proposal and shall finance the costs of implementing segments of such proposal.

"(3) FEDERAL SHARE.—Grants under this paragraph from the fund shall not exceed 50 percent of the costs of implementing the management mechanisms contained in the plan in any fiscal year and shall be made on condition that non-Federal sources provide the remainder of the cost of implementing the management mechanisms contained in the plan during such fiscal year.

"(4) ADMINISTRATIVE COSTS.—Administrative costs in the form of salaries, overhead, or indirect costs for services provided and charged against programs or projects supported by funds made available under this subsection shall not exceed in any fiscal year 10 percent of the annual Federal grant made to a State under this subsection.

"(5) REPORTS.—Any State or combination of States that receives a grant under this subsection shall, within 18 months after the date of receipt of such grant and biennially thereafter, report to the Administrator, the Director, and the Committee on the progress made in implementing the plan. The Administrator, acting through the Director shall transmit each such report along with the comments of the Administrator, the Director, and the Committee, to the Congress.

"(6) GRANT REQUIREMENTS.—The Administrator, acting through the Director, and in consultation with the Committee, may, by regulation, prescribe eligibility requirements, and other requirements that the

Administrator determines to be appropriate, for grants under this subsection.

"(n) Source Reduction Grants.—The Administrator shall consult with Director and the Committee in making grants through the Office of Pollution Prevention in the Agency for onsite reduction of pollution sources .

"(o) Research and Planning Studies and Reports.—

"(1) In general.—The Director, acting through the Committee, shall, not later than 90 days after the issuance of the final report of the Long Island Sound Study, and as determined by the Director, in consultation with the Committee thereafter, establish a schedule for the initiation of the studies described in this subsection. Upon completion of any study described in this subsection, within a reasonable amount of time thereafter, the Director shall prepare a report which outlines recommendations by the Director and the Committee concerning the subject of such study in accordance with the requirements under paragraph (5).

"(2) Exemptions.—If the Director determines that the subject of a study described in this subsection is adequately researched and discussed in the final report of the Long Island Sound Study or in another study or report, the Director shall not be required to conduct such a study under this subsection.

"(3) STUDIES.—The Director shall, acting through the Committee, conduct the following studies:

"(A) an examination of the 'unfinished agenda' described in the final report by the Management Committee of Long Island Sound;

"(B) a 20-year growth assessment of the adequacy of wastewater treatment facilities serving Long Island Sound with respect to estimated increases in population and usage of such facilities;

"(C) a survey of public access issues relating to Long Island Sound, including an examination of—

"(i) the possible role of the United States Fish and Wildlife Service of the Department of the Interior in making recommendations for the purchase of lands for public use,

"(ii) the role of governments of political subdivisions of States in making land acquisitions, and "(iii) the relationship of public access issues to recreational use of land on Long Island Sound;

"(D) the development of a map describing public access on Long Island Sound, and proposals from the survey under subparagraph (C);

"(E) An examination of the problem of contaminated sediments in Long Island Sound;

"(F) an examination of dredging activities in the vicinity of Long Island Sound, including—

"(i) an examination of the issues related to participation in the permit program under section 404 of this Act,

"(ii) proposals for cleaning up dredge dumping sites, and

"(iii) the development of a plan for siting dredge dumping sites which includes the consideration of the use of landfills, deep ocean dumping, and other alternatives to dredge dumping practices in use on the date of enactment of this section;

"(G) an examination of nonpoint source pollution in the vicinity of Long Island Sound, including—

"(i) an examination of the participation of States which form the watershed for Long Island Sound (which includes land in Connecticut, Massachusetts, New Hampshire, New York, and Vermont) in nonpoint source pollution abatement and management, including participation in the nonpoint source pollution management programs under section 319 of this Act, and

"(ii) the development of educational outreach programs to facilitate communication with such States concerning issues surrounding nonpoint source pollution abatement in the vicinity of Long Island Sound;

"(H) an examination of wetlands protection issues, including—

"(i) an analysis of critical wetlands and recommendations for preservation and purchase by the Federal Government, or other appropriate entities,

"(ii) methods for the Federal government to assist States in targeting critical wetlands under State heritage programs, and

"(iii) methods to accomplish wetlands restoration objectives;

"(I) an assessment of effective methods of nitrogen removal that could be used to abate the pollution of Long Island Sound, including an assessment of the biological methods of nitrogen removal used in the demonstration project described in subsection (m);

"(J) an examination, using systems models, of atmospheric precipitation and deposition into the waters of Long Island Sound from acidic and other pollutants in the air, including an assessment of—

"(i) the concentration and rate of deposition,

"(ii) the known and potential toxic effects of pollutants associated with precipitation and dry deposition on biological systems in Long Island Sound, and

"(iii) the etiology of pollutants associated with precipitation and dry deposition from emissions of nitrogen oxides, sulfur dioxide, reactive hydrocarbons, and other chemicals;

"(K) an assessment of water quality issues, including a survey of biological resources to determine—

"(i) water quality requirements to sustain shellfish populations,

"(ii) water quality requirements to sustain wildlife, and

"(iii) an analysis of indicator species that can serve to facilitate assessments of environmental quality; and

"(L) an assessment of recreational uses and demands in the vicinity of Long Island Sound.

"(4) PROHIBITION CONCERNING DUPLICATIVE STUDIES.—Notwithstanding paragraph (3), if the Director makes a determination that—

(A) a comparable study exists for the determination of information required in the study under paragraph (3); and

(B) such comparable study adequately addresses the information required for the study under paragraph (3),

the Director shall not duplicate such study in the preparation of the study required under paragraph (3) and any report required under paragraph (5), but shall incorporate the results of such comparable study into any report required under paragraph (5).

"(5) DEMONSTRATION PROJECTS.—The Director, acting through the Committee, shall conduct the following demonstration projects and incorporate the findings of such demonstration projects into the appropriate studies under paragraph (3):

"(A) A demonstration project for the removal of toxic materials from contaminated sediments in Long Island Sound.

"(B) A demonstration project for the removal of nitrogen from nitrogenous pollutants in Norwalk Harbour in Long Island Sound.

"(6) Requirements for Studies, Demonstration Projects, and Reports.—Each study or demonstration project conducted under this subsection and each plan prepared under this subsection, including any modification to the conservation and management plan made by the management conference pursuant to the authority granted under section 2 of the Long Island Sound Improvement Act of 1989 shall include specific proposals, and where possible, schedules for meeting such proposals on an incremental basis. The Director, acting through the Committee, shall review all such proposals in a timely fashion and make recommendations concerning the implementation of each element of such proposal and each corresponding schedule item (if applicable).

"(7) Annual report by the director.—Not more than 180 days after the date of the issuance of the final report of the Long Island Sound Study and annually thereafter, the Director, acting through the Committee, shall issue a report to the appropriate committees of the Congress and for public distribution, which—

"(A) summarizes any modifications to the conservation and management plan pursuant to section 2 of the Long Island Sound Improvement Act of 1989 made in the 12-month period immediately preceding such report;

"(B) summarizes the review of each element of proposals and corresponding schedule items as described in paragraph (6) conducted in the 12-month period immediately preceding such report; and

"(C) incorporates specific recommendations concerning the implementation of such elements and schedule items associated with subparagraphs (A) and (B).

"(p) Appropriation Authorization.—There are authorized to be appropriated to carry out the purposes of this section $3,000,000 for fiscal year 1990 and each of the fiscal years 1991 through 1997.".

SEC. 5. REVIEW OF CLEAN WATER ACT.

Not more than one calendar year after the date of the enactment of this section, the Director of the Long Island Sound Office of the Environmental Protection Agency, acting through the Long Island Sound Office Advisory Committee established under section 119(f) of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act"), shall review such Act and issue a report to the appropriate committees of the Congress that makes recommendations concerning provisions of such Act that the Policy Committee determines to be related to environmental restoration and conservation and management in the vicinity of Long Island Sound. Such report shall include specific recommendations with respect to any enforcement or discharge standards promulgated under such Act.

SEC. 6. REVIEW OF NITROGEN REMOVAL TREATMENT AT SEWAGE TREATMENT PLANTS.

(a) IN GENERAL.—Not more than one calendar year after the date of the enactment of this section, the Director of the Long Island Sound Office of the Environmental Protection Agency, acting through the Long Island Sound Office Advisory Committee established under section 119(f) of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act"), shall review—

(1) the need for a regional authority to effectuate and fund nitrogen removal treatment at sewage treat-

ment plants in the vicinity of Long Island Sound, and in the watershed that affects water quality in the vicinity of Long Island Sound; and

(2) potential methods of financing such regional authority, including—

(A) surcharges;

(B) sewer fees; and

(C) the authority to issue bonds against funds raised under the methods described under subparagraphs (A) or (B).

(b) REPORT TO CONGRESS.—Not more than one calendar year after the date of the enactment of this section, the Director of the Long Island Sound Office of the Environmental Protection Agency, acting through the Long Island Sound Office Advisory Committee, established under section 119 of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act"), shall issue a report to the appropriate committees of the Congress that makes recommendations concerning—

(1) the need for such regional authority; and

(2) recommended methods of financing such regional authority.

SEC. 7. LONG ISLAND SOUND FUND.

(a) FUND ESTABLISHED.—There is hereby established on the books of the Treasury of the United States a special fund to be known as the "Long Island Sound Fund".

(b) APPROPRIATIONS TO FUND.—

(1) APPROPRIATIONS.—Except as otherwise earmarked under another provision of law, there is hereby appropriated to the Fund for each fiscal year, out of the amounts in the general fund of the Treasury not otherwise appropriated, an amount equal to the sum of the amounts collected by Federal courts as a result of Federal and citizen suits under the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act") relating to violations of such Act occurring in the vicinity of Long Island Sound and in that portion of the watershed of the Long Island Sound in the immediate vicinity of such Sound, as determined by the Administrator of the Environmental Protection Agency. The Secretary of the Treasury shall, from time to time, transfer to the Fund an amount equal to the amounts so designated during each fiscal year, which shall remain available to the Fund without fiscal limitation.

(2) GENERAL FUND.—For the purposes of this subsection, moneys to the general fund shall not be considered as earmarked.

(c) EXPENDITURES.—Amounts in the Long Island Sound Fund shall be available, as provided in appropriation Acts, to the Administrator of the Environmental Protection Agency for the purposes of making expenditures for carrying out section 119 of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act").

○